GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Modern material technologies, PG_00056109		
Field of study	Mechatronics		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
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	5	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Michał Landowski	
	Teachers	dr inż. Michał Landowski dr inż. Aleksandra Świerczyńska dr inż. Krzysztof Krzysztofowicz	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	0.0	0.0	0.0	30

E-learning hours included: 0.0

eNauczanie source addresses:
Moodle ID: 9265 Nowoczesne technologie materiałowe, W, MTR, I st., sem. 05, zimowy 2026/27 (PG_00056109)
https://enauczanie.pg.edu.pl/2025/course/view.php?id=9265

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

The student obtains knowledge about the structure and techniques of forming composite materials.

The student obtains knowledge and skills related to the selection and design of composite materials.

Learning outcomes

Course outcome	Subject outcome	Method of verification

Subject contents

Course content – lecture

Lecture: Definition and division of composite materials.Factors influencing the properties of composite materials.The geometry of the reinforcement of composite materials.Characteristics (properties, manufacturing techniques) of glass, carbon, aramid, boron, silicon carbide and aluminum oxide fibers.Prediction of elastic properties and strength as a function of quantity and geometry of the reinforcement.Structure and importance of the boundary layer in polymer and metal matrix composites.Manufacturing techniques, typical properties and practical examples of applications of metal, ceramic and polymer composites. Techniques for the production of materials by powder metallurgy. Technological defects of composite materials. Composite structural materials. Gradient materials. Computer aided production and material selection.

Prerequisites and co-requisites

Basic knowledge of materials science and strength of materials.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	50.0%	100.0%

Recommended reading	Basic literature	• A.Boczkowska, J.Kapuścinski, Z.Linderman, D.Witemberg-Perzyk, S.Wojciechowski : Kompozyty. PW 2003. • W. Królikowski, Polimerowe kompozyty konstrukcyjne, PWN 2012 • J.Sobczak, Kompozyty metalowe, 2002 • Imielińska K., Papanicolaou G.C., Wprowadzenie do nauki o materiałach kompozytowych Kompozyty polimerowe, Wybrane zagadnienia, Skrypt PG, Gdańsk 1998. • F.L. Mattews, R.D.Rawlings, Composite Materials. 2008
	Supplementary literature	• Dobrzański L.A.: Podstawy nauki o materiałach i metaloznawstwo. WNT, Warszawa, 2002. • M. Reyne, Composite solutions, JEC Group 2006
	eResources addresses	
Example issues/ example questions/ tasks being completed	Choose a technology of making a carbon fiber rod. Give examples of applications of metal matrix composite materials in the automotive industry. Choose the material for the construction of the yacht's hull.	
Practical activites within the subject	Not applicable	

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