GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Material Science, PG_00071178						
Field of study							
Date of commencement of studies	February 2026		Academic year of realisation of subject	2025/2026			
Education level	second-cycle studies		Subject group				
Mode of study	Part-time studies		Mode of delivery	at the university			
Year of study	1		Language of instruction	Polish			
Semester of study	1		ECTS credits	2.0			
Learning profile	general academic profile		Assessment form	exam			
Conducting unit	Department of Polymer Technology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Janusz Datta				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	9.0	0.0	0.0	0.0	9.0	18
	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	18		4.0		28.0	50
Subject objectives	To deepen knowledge of the structure, properties, testing methods and applications of materials, with particular emphasis on the relationships between their structure, chemical composition and functional properties, as well as on material selection for specific applications, processing and recycling.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K03] is aware of the non-technical aspects and effects of the Master of Science in Chemical Engineering's activities, including the impact on the environment, and is aware of the responsibility for the decisions made, the observance and development of the principles of professional ethics and actions to ensure compliance with these principles	is aware of the environmental and social impacts of engineering activities and the responsibility for decisions made and compliance with the principles of professional ethics.	[SK5] Assessment of ability to solve problems that arise in practice
[K7_U06] is able to assess the usefulness and possibility of using new achievements (techniques and technologies) in the field of design, modernization and optimization of material technologies and their recycling	is able to assess the applicability of new techniques and technologies in the design, improvement and optimisation of material production and recycling processes.	[SU1] Assessment of task fulfilment
[K7_K04] is able to cooperate and work in a group, taking on different roles	is ready to work in a team, assuming different roles.	[SK1] Assessment of group work skills
[K7_U04] is able to conduct a detailed analysis of the obtained results and develop them in the form of a technical report or presentation, also in English	is able to analyse research results and present them in technical reports or presentations, also in English.	[SU2] Assessment of ability to analyse information
[K7_W01] has extensive knowledge of technologies related to the production and management of waste from various material groups	knows the main groups of materials, their properties, applications, and processing and recycling methods.	[SW1] Assessment of factual knowledge
[K7_W04] has in-depth knowledge in the field of chemical sciences/ chemical engineering/materials engineering, enabling the description of the properties of materials, processes and technological operations involving them, taking into account recycling	has in-depth knowledge of material properties and technologies for their production, processing and recycling.	[SW2] Assessment of knowledge contained in presentation

Subject contents

Course content – lecture

Classification of materials and their properties. Relationships between the structure, chemical composition and properties of materials. Metallic, ceramic, polymeric and composite materials. Methods for testing material properties. Applications of materials, processing technologies, and methods of recycling and waste management.

Course content – seminar

Analysis and comparison of the properties of selected material groups. Selection of materials for specific applications. Analysis of material testing methods and interpretation of results. Assessment of material processing, reuse and recycling possibilities based on technical literature. Presentation and discussion of results.

Prerequisites and co-requisites

Basic knowledge of chemistry, materials science, and the properties and applications of materials.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Lecture – final assessment test	50.0%	60.0%
Seminar – presentation	100.0%	40.0%

Recommended reading

Basic literature	M. Głowacka, A. Zieliński (red.), Podstawy materiałoznawstwa, Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2014. A. K. Błędzki, J. Kijeński, R. Jeziórska (red.), Odzysk i recykling materiałów polimerowych, Wydawnictwo Naukowe PWN, Warszawa, 2011.
Supplementary literature	J. F. Rabek, Współczesna wiedza o polimerach. Tom 1: Budowa strukturalna polimerów i metody badawcze, Wydawnictwo Naukowe PWN, Warszawa, 2019 J. Datta, P. Jutrzenka-Trzebiatowska, P. Kasprzyk, Wybrane zagadnienia recyklingu tworzyw sztucznych i gumy, Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2018
eResources addresses	

Example issues/ example questions/ tasks being completed	1. Based on literature data, assess the influence of material composition and structure on its functional properties. 2. Select a recycling method for a chosen material waste and justify the choice.
Practical activites within the subject	Not applicable

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