GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Modern construction materials, PG_00068311		
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	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
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	4.0
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	18.0	0.0	0.0	27

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	27	11.0	62.0	100

Subject objectives

The aim of the course is to familiarize students with modern construction materials, their properties, manufacturing methods, applications, and possibilities for recycling and reuse in modern industry.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W07] ma wiedzę o trendach rozwojowych i najistotniejszych nowych osiągnięciach dotyczącą zagadnień związanych z technologią materiałową i recyklingiem	The student has knowledge of new development trends and achievements related to materials technology and recycling.	[SW3] Assessment of knowledge contained in written work and projects
[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	The student is aware of the consequences of their decisions and their impact on the environment, as well as the need to develop professional ethics.	[SK2] Assessment of progress of work
[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	he student is able to assess the usefulness and has the ability to use new achievements to design new materials and technologies.	[SU2] Assessment of ability to analyse information
[K7_W05] knows the methods, techniques, tools and materials used to solve complex engineering tasks in the field of materials technology and their recycling	The student has the knowledge necessary to properly use various materials and tools to solve engineering tasks in the field of materials technology and recycling.	[SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Course content – lecture
Overview of modern construction materials, including metals and their alloys, polymeric, ceramic, and composite materials; relationships between structure and material properties; modern technologies for manufacturing and modifying materials; criteria for selecting materials for engineering applications; examples of industrial applications; issues of recycling, raw material recovery, and environmental and sustainable development aspects.

Course content – laboratory
The task consists in selecting a material for a specific technical application indicated or agreed with the student, taking into account operational requirements, mechanical and physical properties, analysis of material selection charts (e.g., Ashby charts), and the possibility of recycling and reuse. It includes the preparation of design documentation and a report on the analyses and calculations performed, together with sketches.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of materials science, construction materials, and materials engineering.</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>laboratory pass</td><td>50.0%</td><td>40.0%</td></tr>
<tr><td>lecture exam</td><td>50.0%</td><td>60.0%</td></tr>
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</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Ashby M., Materiały inżynierskie. Struktura, właściwości, projektowanie, WNT, Warszawa 2011

Królikowski W.: Polimerowe kompozyty konstrukcyjne. PWN, Warszawa, 2012

Ashby M.F: Dobór materiałów w projektowaniu inżynierskim, Pergamon Press, Oxford 1998.

Callister W.D., Materials Science and Engineering: An Introduction, Wiley, New York 2018</td></tr>
<tr><td>Supplementary literature</td><td>Scientific articles from journals such as: Materials Science and Engineering, Journal of Materials Processing Technology, Composites Science and Technology</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>1.Based on Ashby's graph for metals and polymers, select the material with the highest stiffness and minimum density. Justify your choice and present comparative graphs.

2. Select a construction material used in the automotive industry and assess its suitability for recycling. What measures can be taken to reduce its environmental impact?

3. A carbon fiber panel with specific dimensions is given..... Calculate the maximum load it can carry if the permissible stress is ..... MPa.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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