GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Polymer composites and biocomposites, PG_00060802		
Field of study	Chemical Technology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
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	3	Language of instruction	Polish
Semester of study	6	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Polymer Technology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Justyna Kucińska-Lipka	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	15.0	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	2.0	18.0	50

Subject objectives

The aim of the course is to familiarize students with the production, properties and applications of polymer-based composites (including thermoplastic, thermosetting and elastomeric), including composites obtained using natural raw materials.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U11] individually plans and implements his/her own learning	The student is able to plan his/her own work, including selecting appropriate literature, research methods and techniques for a given material, including a polymer composite.	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K6_W09] has knowledge of the technological and functional properties of polymers, the physical basis and processing methods of polymers and rubber	The student has the knowledge necessary to describe the properties of polymer composites based on thermoplastic, thermosetting, and elastomeric polymers and is able to identify methods for their preparation.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
[K6_K01] understands the need for continuing education, and is aware of the opportunities to improve professional, personal and social competences	The student is aware of the dynamic development of plastics production and processing as an industry and understands the need to continuously improve their qualifications.	[SK4] Assessment of communication skills, including language correctness
[K6_U06] is able to select the chemical and technological concept of the production method, is able to justify the suitability of the raw materials used, analyses and evaluates the quality of the products obtained, critically analyses the functioning of existing technical solutions and evaluates these solutions	Student is able to select the raw materials necessary for the production and production method of a polymer-based composite or biocomposite for a specific application and justify their choice. Student can identify methods and techniques for characterizing the resulting material, including assessing its quality.	[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task

<table>
<tr><td>Subject contents</td><td>Course content – lecture
• Raw materials used in the production of polymer composites and biocomposites: polymer matrices (thermoplastic, thermosetting, and elastomeric), powder and fibrous fillers (short fibers, long fibers, mats and fabrics), and auxiliary agents
• Methods for obtaining polymer composites and biocomposites
• Properties of polymer composites and biocomposites
• Methods for testing the properties of polymer composites and biocomposites
• Industrial applications of polymer composites and biocomposites
Course content – seminar
• Student presentations on selected topics related to the production, properties, and applications of polymer-based composites and biocomposites.
• Discussions between students and the teacher, and between students, on selected topics related to the production, properties, and applications of polymer-based composites and biocomposites.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></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>lecture: written test</td><td>60.0%</td><td>55.0%</td></tr>
<tr><td>seminar: attendance, preparation of presentation and presentation outline, active participation in the discussion</td><td>85.0%</td><td>45.0%</td></tr>
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<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>• W. Królikowski, Polimerowe kompozyty konstrukcyjne, PWN, Warszawa 2023
• A. Boczkowska, G. Krzesiński: Kompozyty i techniki ich wytwarzania, Wydawnictwo PW, Warszawa 2016</td></tr>
<tr><td>Supplementary literature</td><td>• A.P. Wilczyński: Polimerowe kompozyty włókniste, WNT, Warszawa 1996
• J. Rabek: Polimery i ich interdyscyplinarne zastosowania, PWN, Warszawa 2020</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>• List and characterize the types of polymer matrices in composites and biocomposites.
• List and characterize the types of powder and fibrous fillers.
• List and characterize the methods for obtaining polymer composites and biocomposites.
• List the methods for testing the morphology and properties of polymer composites and biocomposites.
• Provide examples of industrial applications of polymer composites and biocomposites and indicate which of their properties are key in a given applications</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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