GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Polymeric Materials Recycling, PG_00072446		
Field of study	Materials Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	Obligatory subject group 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 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	prof. dr hab. inż. Janusz Datta	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	15.0	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	3.0	17.0	50

Subject objectives

Acquainting students with current methods of recycling waste from polymer materials (dedicated forms of recycling for waste from main production areas (electronics, cars, construction), including sorting, identification and disposal of waste, Reuse of recyclates

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U03] Can critically analyze and evaluate the functioning – particularly in the context of materials engineering –existing technical solutions, particularly equipment, objects, systems, processes.	The student is able to critically analyze how existing technical solutions—particularly equipment and processes—function	[SU2] Assessment of ability to analyse information
[K6_W03] Has knowledge of materials science and can relate the properties of materials with their structure and composition, knows the theoretical description of phenomena occurring in materials subjected to external factors.	The student has knowledge of materials science that enables him or her to relate the properties of materials to their chemical structure and characteristics	[SW1] Assessment of factual knowledge
[K6_W07] Has detailed knowledge of selected problems of materials science.	The student has knowledge related to materials science	[SW3] Assessment of knowledge contained in written work and projects

<table>
<tr><td>Subject contents</td><td>Course content – lecture
The lecture covers topics related to the classification of polymeric materials, methods for sorting and identifying polymeric materials, mechanical and chemical recycling technologies, and energy recovery, as well as a basic assessment of the environmental and economic efficiency of polymeric material recovery processes originating from major manufacturing sectors (electronics, automotive, and construction)

Course content – project
The project involves analyzing and selecting recycling technologies for a specific polymer material, developing a process flow diagram, selecting equipment, and evaluating the economic and environmental efficiency of the polymer material recovery process.

Examples of project tasks:

1) Design of a mini-line for plastic recycling 2) Design of a PET recycling plant 3) Analysis of the impact of multiple processing on selected polymer properties 4) Design of a process for producing 3D filament from recycled material 5) Comparison of mechanical and chemical PET recycling</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of production and chemical structure of main polymers; general knowledge of environmental protection.</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>project</td><td>100.0%</td><td>50.0%</td></tr>
<tr><td>lecture colloquium</td><td>50.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>1. A. Błedzki i innni. Odzysk i recykling materiałów polimerowych,Wydawnictwo Naukowe PWN, Warszawa, 2021

2. Praca zbiorowa pod redakcją A. Błędzkiego, Recykling materiałów polimerowych, WNT Warszawa 1997

3. Praca zbiorowa pod redakcją A Prociak i in. Materiały poliuretanowe, PWN, Warszawa, 2014.</td></tr>
<tr><td>Supplementary literature</td><td>Poradnik TWORZYWA SZTUCZNE W PRAKTYCE 2007 Verlag Dashofer, Warszawa</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1) Suggest a course of action for effective recycling of car seats.

2) Choose a recycling technique and describe the necessary steps to recycle PA profile waste</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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