GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Multiphase Polymer Systems, PG_00039688		
Field of study	Materials Engineering, Materials Engineering, Materials Engineering		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024
Education level	second-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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Polymers Technology -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Łukasz Piszczyk	
	Teachers	dr hab. inż. Łukasz Piszczyk dr inż. Paulina Kosmela	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	0.0	0.0	15.0	45

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	45	5.0	25.0	75

Subject objectives

Gather the knowledge on the types of multiphase polymer materials, recognition of mechanism of inter and intra phases organization in 3D space., understanding the influence of chain organiozation on the properties of the materials, Give the fundamental knowledge on microscopic and electron microscopic methods of polymer material analysis.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K7_W07	Can design appropriate polymer systems for specific applications	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
K7_K01	He knows the method of acquiring information about various polymer systems and is able to use them to analyze the properties of different multiphase polymeric materials	[SK5] Assessment of ability to solve problems that arise in practice

Subject contents

The types of multipase polymer materials. The difference between multiphase and multicomponent materials. The entities of crystalline polymers, crystallization models, types of interphases and crystalline aggregates. Block copolymers; phase separation in amorphous and crystalline materials, types and morphology of submolecular structures and steering with them. Polymer blends: genesis of polymer mixing, diagrams and their interpretation for liquid-liquid, liquid-bulk and bulk-bulk types. Polymer compozites and inteaction at the phase border. Micrsocopy in the studies of multiphase polymer materials, The influence of morphology types on the properties of polymers.

Prerequisites and co-requisites

The fundamental knowledge on macromolecular compounds

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>zaliczenie prezentacji, sprawozdań i wejściówek</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>Zaliczenie pisemne i prezentacja i ew. ustnie grupowa</td><td>60.0%</td><td>60.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>Asby F. M.: Materiały inżynierskie, Tom 2 WNT 1996

Ceresa R., J.: Kopolimery blokowe i szczepione, WNT 1962

Bojarski J.: Polietylen, WNT 1963

Albrecht W.: poliamidy, WNT1974</td></tr>
<tr><td>Supplementary literature</td><td>Piórkowska E., Rutlege G., G.: Handbook of polymer crystallization. Wiley 2013

Callister W., D.: Materials science and engineering. Wiley 1994</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Give examples of crystalline polymers, discuss their morphological elements and the impact on the properties.

The idea of phase separation in block copolymers, a driving force contributing to the phase separation and the formation of domain structures.

Examples of the importance of phase structures in polymer blends, the effect of processing parameters and composition of the mixture on the properties of the material.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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