



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 2022	Academic year of realisation of subject			2022/2023		
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				
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 organization 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 composites and interaction at the phase border. Microscopy 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						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	zaliczenie prezentacji, sprawozdań i wejściówek		60.0%		40.0%		
	Zaliczenie pisemne i prezentacja i ew. ustnie grupowa		60.0%		60.0%		

Recommended reading	Basic literature	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
	Supplementary literature	Piórkowska E., Rutledge G., G.: Handbook of polymer crystallization. Wiley 2013 Callister W., D.: Materials science and engineering. Wiley 1994
	eResources addresses	
Example issues/ example questions/ tasks being completed	<p>Give examples of crystalline polymers, discuss their morphological elements and the impact on the properties.</p> <p>The idea of phase separation in block copolymers, a driving force contributing to the phase separation and the formation of domain structures.</p> <p>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.</p>	
Work placement	Not applicable	