



Subject card

Subject name and code	Modifications of Macromolecular Compounds, PG_00064346						
Field of study	Chemical Technology						
Date of commencement of studies	February 2027		Academic year of realisation of subject		2027/2028		
Education level	second-cycle studies		Subject group		Optional subject group Specialty 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		exam		
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	15.0	0.0	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		5.0		40.0	75
Subject objectives	The aim of this course is to familiarize students with methods for the physical and chemical modification of macromolecular materials. The purpose of polymer modification and selected modified polymers of industrial importance will be discussed.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W101] is able to make an in-depth identification of key objects and phenomena related to the field of study, as well as theories that describe them and applicable analytical and design methods		is able to list and characterize the types of methods used for physical and chemical modification of polymers. The student is able to explain the purpose of using physical and chemical modifications and the applications of modified polymer materials.		[SW1] Assessment of factual knowledge		
	[K7_U04] predicts the properties of the materials obtained and the course of processes involving them, based on knowledge of technology and related fields and computer methods of data analysis, modelling and simulation		is able to describe the influence of applied physical and chemical modifications on the chemical structure and properties of the modified polymer. The student is able to modify the polymer using selected methods.		[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
Subject contents	Course content – lecture						
	<ul style="list-style-type: none">• Introduction to the physical and chemical modification of polymers• Biopolymers (sugars and proteins) and their physical and chemical modification. Thermoplastic starch• Chemistry and technology of asphalt processing. Modification of asphalt with polymers• Modification of rubbers and rubber. Compatibility of polymer blends• Methods of physical modification of polymers• Modification of polymers surface. Tribology of polymers• Modification of polymers for tissue engineering applications• Modification of polymers for wound dressing applications						
	Course content – laboratory						
	<ul style="list-style-type: none">• Mechanochemical modification of rubber - use of peptizers• Compatibility of thermoplastic-rubber systems• Thermoplastic starch Polyurethane-wood composites• Preparation of modified poly(vinyl chloride) films						

Prerequisites and co-requisites	Basic knowledge of polymer chemistry and technology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	laboratory: class work and reports	100.0%	50.0%
	lecture: test	50.0%	50.0%
Recommended reading	Basic literature	<ul style="list-style-type: none">J. Rabek: <i>Współczesna wiedza o polimerach. Tom II: Polimery naturalne i syntetyczne, otrzymywanie i zastosowania</i>, PWN, Warszawa 2017J. Rabek: <i>Biopolimery. Tom I: Od podstaw do zastosowań</i>, PWN, Warszawa 2022	
	Supplementary literature	<ul style="list-style-type: none">J. Meister: <i>Polymer Modification: Principles, Techniques, and Applications</i>, CRC Press, 2000	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none">List methods for modifying the surface layer of polymers.Discuss the purpose of modifying asphalt with polymers.List methods for chemically modifying starch.Discuss the production of thermoplastic starch.		
Practical activities within the subject	Not applicable		

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