GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	MODYFICATIONS OF MACROMOLECULAR COMPOUNDS, PG_00064346		
Field of study	Chemical Technology		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2025/2026
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 -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Justyna Kucińska-Lipka	
	Teachers	dr hab. inż. Justyna Kucińska-Lipka dr inż. Krzysztof Formela dr inż. Marcin Włoch mgr inż. Przemysław Gnatowski dr hab. inż. Łukasz Piszczyk dr hab. inż. Michał Strankowski dr inż. Maciej Sienkiewicz prof. dr hab. inż. Janusz Datta	

Lesson types and methods of instruction

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

eNauczanie source addresses:

Moodle ID: 1601 2025/2026 - MODYFIKACJE ZWIĄZKÓW WIELKOCZĄSTECZKOWYCH - WYKŁAD / LABORATORIA
https://enauczanie.pg.edu.pl/2025/course/view.php?id=1601

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	The student 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	The student 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.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment

Subject contents

LECTURE:

- 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

LABORATORY:

- 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: attendance, class work and reports	100.0%	50.0%
lecture: test	50.0%	50.0%

Recommended reading

Basic literature	• J. Rabek: *Współczesna wiedza o polimerach. Tom II: Polimery naturalne i syntetyczne, otrzymywanie i zastosowania*, PWN, Warszawa 2017 • J. Rabek: *Biopolimery. Tom I: Od podstaw do zastosowań*, PWN, Warszawa 2022
Supplementary literature	• J. Meister: *Polymer Modification: Principles, Techniques, and Applications*, CRC Press, 2000
eResources addresses	

Example issues/ example questions/ tasks being completed

- 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.

Work placement

Not applicable

Document generated electronically. Does not require a seal or signature.