GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Chemistry of Polymers, PG_00061914		
Field of study	Materials Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	3.0
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	dr hab. inż. Justyna Kucińska-Lipka	
	Teachers	dr hab. inż. Justyna Kucińska-Lipka	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	30.0	0.0	0.0	60

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	60	5.0	10.0	75

Subject objectives

The aim of the course is gaining knowledge of the structure, properties and synthesis methods polymers of practical importance

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_K01] Understands the need to improve professional and personal competencies; is conscious of own limitations and knows when to turn to experts, properly establishes priorities helping to accomplish tasks defined by oneself or others.	The student knows how to improve his/her own competences and knows when to turn to experts for help, is able to appropriately define priorities for the implementation of tasks defined by himself/herself or others.	[SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice
[K6_U01] Can properly use selected analytical, simulation and experimental methods, as well as devices for measuring the fundamental properties of materials and technological processes.	The student is able to use analytical methods and devices enabling the measurement of basic quantities characterizing materials and synthesis processes.	[SU4] Assessment of ability to use methods and tools
[K6_W02] has knowledge of physics and chemistry, useful for formulating and solving simple problems within the scope of materials science	The student has knowledge of physics and chemistry useful for solving problems related to the synthesis of polymers and the interpretation of their properties.	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture
LECTURE: Basic concepts: monomers, oligomers, homopolymers, copolymers, terpolymers, polymer materials. Division of monomers and polymers. Types of polyreactions. Radical polymerization, initiators and chemical reactions occurring in the processes of initiation, growth and termination of chains - kinetics. Polymers produced by radical polymerization. Anionic polymerization of selected monomers. Polymers produced in anionic polymerization. Condensation polymerization: homopolycondensation, heteropolycondensation, copolycondensation and cross-linking polycondensation. Chemical reactions occurring in polycondensation processes leading to the production of polymers of practical use.
LABORATORY: Radical polymerization: polymerization of methyl methacrylate in mass Radical polymerization: polymerization of methyl methacrylate in suspension and emulsion Polyaddition: synthesis of elastomers and polyurethane foams Polycondensation: Polyamide 6.6 and 6.10 Technology of elastomers and latex products Chemical modification of polymers: obtaining poly(vinyl alcohol) from poly(vinyl acetate) Chemistry and technology of epoxy resins Polymer hydrogels Reactive molding technology

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3"></td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td></td><td>100.0%</td><td>25.0%</td></tr>
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</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">• Z. Florjańczyk i S. Penczka: Chemia polimerów, T1. Makroczasteczki i metody ich otrzymywania, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001
• J. Pielichowski, A. Puszyński: Chemia polimerów, WNT Kraków 2004</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">• W.C. Callister, D.G. Rethwisch: Materials Science & Engineering, 10th Edition, John Wiley & Sons, New York 2020
• Polish and foreign scientifc journals</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">What are: monomers, oligomers, homopolymers, copolymers, terpolymers, polymeric materials?Division of monomers and polymers.Types of polyreactions.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="3">Not applicable</td></tr>
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