



Subject card

Subject name and code	CHEMISTRY AND TECHNOLOGY OF MACROMOLECULAR COMPOUNDS, PG_00064309						
Field of study	CHEMIA I TECHNOLOGIA ZWIĄZKÓW WIELKOCZĄSTECZKOWYCH						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2025/2026		
Education level	second-cycle studies		Subject group		Optional subject group Specialty subject group		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		5.0		
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	30.0	0.0	45.0	0.0	0.0	75
	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	75		10.0		40.0	125
Subject objectives	The aim of the course is to apply laboratory and industrial methods in issues related to the chemistry and synthesis of oligomeric and macromolecular substances						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U02] carries out experiments using properly selected techniques and apparatus, taking advantage of new developments in technology and related fields		The student is able to: select a processing method for a group of polymers, describe the method of obtaining a polymer using the technological scheme of its production (including the names of the basic equipment); explain the need to use specific temperature and pressure conditions in relation to the synthesis and processing of polymers		[SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu [SU1] Ocena realizacji zadania		
	[K7_W02] selects appropriate apparatus and materials for the manufacture and processing of consumer goods		The student is able to select laboratory equipment and chemical raw materials necessary for polymer syntheses		[SW1] Ocena wiedzy faktograficznej		
	[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 estimate the final effect in the form of properties of the obtained semi-finished product and the final product based on knowledge in the field of polymer chemistry and technology.		[SU2] Ocena umiejętności analizy informacji		
	[K7_W01] defines the phenomena, processes and laws of nature used to produce consumer goods and provide services		The student is able to list and describe polymer synthesis methods (including stages and necessary raw materials). The student is able to list and describe methods of obtaining selected biopolymers.		[SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym		

Subject contents	Course content – lecture LECTURE Mechanisms of synthesis of macromolecular compounds Laboratory and industrial methods of polymer synthesis. Criteria for selecting the synthesis method and the method for product isolation and purification Review of industrial methods for obtaining selected oligomers and polymers, e.g. polyolefins, vinyl polymers, polyamides, polyesters, polyurethanes, epoxy resins, phenol-formaldehyde resins and their derivatives, silicones, biodegradable and biomedical polymers LABORATORY: Independent synthesis of macromolecular compounds: 1/2. Synthesis of urethane elastomers (synthesis and technical characteristics of urethane prepolymers and their use in the synthesis of cast urethane elastomers and microporous urethane elastomers)3. Synthesis of polyurethane foams for medical applications4. Technology for obtaining biodegradable polymer materials based on potato starch5/6. Synthesis of epoxy resin from bisphenol A and epichlorohydrin and its industrial use in the production of composites and coatings7/8. Synthesis of unsaturated polyester resin and its industrial use in the production of polyester composites9. Synthesis of polyamide (nylon)10. Synthesis of siloxanes (silicones)11. Bulk polymerization of styrene or methyl methacrylate12. Emulsion polymerization of styrene or methyl methacrylate13. Suspension polymerization of styrene or methyl methacrylate14. Solution polymerization of styrene, methyl methacrylate or vinyl acetate15. Synthesis of phenol-formaldehyde resin		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	lecture	60.0%	60.0%
	laboratory	60.0%	40.0%
Recommended reading	Basic literature	- G. Odian, Principles of Polymerization, John Wiley & Sons, 2004 - G. Moad, D.H. Solomon, The Chemistry of Free Radical Polymerization	
	Supplementary literature	- G. Odian, Principles of Polymerization, John Wiley & Sons, 2004 - G. Moad, D.H. Solomon, The Chemistry of Free Radical Polymerization	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Mechanisms of synthesis of macromolecular compounds Laboratory and industrial methods of polymer synthesis. Criteria for selecting the synthesis method and the method for product isolation and purification Review of industrial methods for obtaining selected oligomers and polymers, e.g. polyolefins, vinyl polymers, polyamides, polyesters, polyurethanes, epoxy resins, phenol-formaldehyde resins and their derivatives, silicones, biodegradable and biomedical polymers LABORATORY: Independent synthesis of macromolecular compounds: 1/2. Synthesis of urethane elastomers (synthesis and technical characteristics of urethane prepolymers and their use in the synthesis of cast urethane elastomers and microporous urethane elastomers) 3. Synthesis of polyurethane foams for medical applications 4. Technology for obtaining biodegradable polymer materials based on potato starch 5/6. Synthesis of epoxy resin from bisphenol A and epichlorohydrin and its industrial use in the production of composites and coatings 7/8. Synthesis of unsaturated polyester resin and its industrial use in the production of polyester composites 9. Synthesis of polyamide (nylon) 10. Synthesis of siloxanes (silicones) 11. Bulk polymerization of styrene or methyl methacrylate 12. Emulsion polymerization of styrene or methyl methacrylate 13. Suspension polymerization of styrene or methyl methacrylate 14. Solution polymerization of styrene, methyl methacrylate or vinyl acetate 15. Synthesis of phenol-formaldehyde resin		
Practical activities within the subject	Not applicable		

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