



Subject card

Subject name and code	The caoutchouc and rubber technology, PG_00060806						
Field of study	Chemical Technology						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2026/2027		
Education level	first-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	4	Language of instruction			Polish		
Semester of study	7	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						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	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	The aim of the course is to familiarize students with issues related to rubber technology, including the raw materials used, methods of obtaining rubber mixtures and their vulcanization, and machines and devices used in the rubber industry.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_K02] understands the non-technical aspects and implications of the activities of a chemical engineer, including the impact on the environment, is aware of professional behaviour, observance of professional ethics and respect for diversity of views and cultures		The student understands and is able to describe non-technical aspects and effects of the activities of a rubber and rubber technology engineer in relation to the impact on human health and life and the environment.		[SK2] Assessment of progress of work [SK4] Assessment of communication skills, including language correctness		
	[K6_U07] recognizes and identifies the basic polymer processing methods used in industry, classifies and differentiates the equipment used for these purposes		The student is able to list, characterize and select raw materials, apparatus, machines and devices used in rubber technology for the indicated application.		[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W09] has knowledge of the technological and functional properties of polymers, the physical basis and processing methods of polymers and rubber		The student is aware of the technological and functional properties of rubber compounds and vulcanized rubber, and is able to list and describe them.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	[K6_U12] applies the principles of health and safety at work		The student is able to work in accordance with occupational safety and health regulations when handling raw materials, machinery, and equipment used in rubber technology.		[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	Course content – lecture		
	<ul style="list-style-type: none"> <li>• Introduction to rubber chemistry and technology: basic concepts</li> <li>• Rubbers in rubber technology: types, properties, and applications</li> <li>• Auxiliary raw materials used in rubber technology: activators, accelerators, vulcanizing/crosslinking agents, plasticizers, fillers, anti-aging agents, and more. Vulcanization.</li> <li>• Machinery and equipment used in the processing of rubbers/rubber compounds</li> </ul>		
Prerequisites and co-requisites	Course content – laboratory		
	<ul style="list-style-type: none"> <li>• Preparation of rubber mixtures and their vulcanization</li> <li>• Characterization of rubber mixture properties: determination of the optimum vulcanization and Mooney viscosity</li> <li>• Characterization of rubber vulcanizates properties: Shore hardness, Schob rebound elasticity, Schooper-Schlobach abrasion, and static tensile properties</li> </ul>		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	lecture: test	60.0%	60.0%
	laboratory: attendance, entry test and reports	60.0%	40.0%
Recommended reading	Basic literature	<ul style="list-style-type: none"> <li>• J. Datta, M. Włoch: Inżynieria Elastomerów, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2018</li> <li>• J. R. White: Poradnik Technologa Gum, Rapra Technology Ltd, 2003</li> </ul>	
	Supplementary literature	<ul style="list-style-type: none"> <li>• J.E. Mark, B. Erman, M. Roland (Eds): The Science and Technology of Rubber, Academic Press, 2013</li> </ul>	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> <li>• List three characteristics of elastomers.</li> <li>• List the components of the vulcanizing system.</li> <li>• List the types of accelerators used in the rubber industry.</li> <li>• Give examples of active and inactive fillers used in the rubber industry.</li> <li>• What is the physical state of elastomers at room temperature?</li> </ul>		
Practical activities within the subject	Not applicable		

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