

## 。 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

Subject name and code	Engineering of Elastomers, PG_00039715								
Field of study	Materials Engineering, Materials Engineering, Materials Engineering								
Date of commencement of studies	October 2022		Academic year of realisation of subject			2024/2025			
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	3		Language of instruction			Polish			
Semester of study	6		ECTS credits			5.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Department of Polymers Technology -> Faculty of Chemistry								
Name and surname	Subject supervisor		prof. dr hab. inż. Janusz Datta						
of lecturer (lecturers)	Teachers								
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	30.0	0.0	30.0	0.0		0.0	60	
	E-learning hours included: 0.0								
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19200								
Learning activity and number of study hours	Learning activity Participation in classes include plan		a didactic Participation in ed in study consultation hours		Self-study SUM				
	Number of study 60 hours		5.0		60.0		125		
Subject objectives	Teaching the basic principles of elastomer's calculation and the creation of technological formulations, as well indication of the influence of selected factors on some properties of elastomers								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	K6_U03		Can analyze the functioning and evaluate the existing technical solutions			[SU1] Assessment of task fulfilment			
	K6_K01		Recognizes the influence of various factors on the properties of elastomers			[SK5] Assessment of ability to solve problems that arise in practice			
	K6_W06		Can calculate / choose the composition the formulation leading to elastomers			[SW1] Assessment of factual knowledge			
	K6_U02		Knows the basics of selecting conditions machine settings used in elastomer technology			[SU3] Assessment of ability to use knowledge gained from the subject			
Subject contents	Definition of elastomers. Highly flexible condition. The theory of rubber elasticity. Mooney-Rivlin equations. Static mechanical properties of elastomers. Natural rubber and synthetic rubbers - chemical structure, production and properties. Vulcanization of rubbers and reconditioning of mixtures. Modern vulcanization teams. Cross-link density. Thermoplastic elastomers. Plasticizers. Softened plastomers: polyvinyl chloride. Fiber reinforced elastomers.								
Prerequisites and co-requisites	Knowledge of the methods of obtaining macromolecular compounds. Basic knowledge of impact the chemical structure of the polymer and its properties								
Assessment methods and criteria	Subject passing criteria		Passing threshold			Percentage of the final grade			
	Lecture: written exam		50.0%			50.0%			
	Laboratory: quiz, report		50.0%			50.0%			

Recommended reading	Basic literature	<ol> <li>Koszelew F. F., Korniew A. E., N.S Klimow - Ogólna technologia gumy, WNT, Warszawa, 1972</li> <li>Praca zborowa po red Z.Florjańczyka i S.Pęczka, Chemia polimerów, T2 i 3, Oficyna Wydawnicza Polit.Warszawskiej 1995 3)A.N.Gent, Engineering with Rubber, Hanser Publishers, Munich Viena New York Barcelona, 1992.</li> <li>Praca zbiorowa: W Parasiewicz, W. Rzymski, Elastomery i przemysł gumowy, Piastów-Łodź 2006</li> </ol>				
	Supplementary literature	<ol> <li>B. Łączyński, Tworzywa wielkocząsteczkowe. Rodzaje i własności,WNT,Warszawa, 1982</li> <li>I. Franta, Elastomers and Rubber Compounding Materials,ELSEVIER, Amsterdam-Oxford-NewYork-Tokyo, 1989.</li> <li>J. A. Brydson, Rubbery Materials, Elsevier Applied Science, London and New York, 1988.</li> </ol>				
	eResources addresses	Adresy na platformie eNauczanie:				
Example issues/ example questions/ tasks being completed	1) List the three basic properties of elastomers and indicate the research methods / techniques used to determine one of them.					
	<ul> <li>2) Describe the mechanism of active sulphide complex formation in the case of vulcanization with the chosen accelerator</li> <li>3) Draw the volkametric curve of the mixture based on natural rubber (sulfur vulcanization) with a clear vulcanization plateau and present the method of determining the optimal vulcanization time.</li> </ul>					
Work placement	Not applicable					

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