

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Modelling of heat and plastic treatment processes of materials, PG_00059373								
Field of study	Mechanical Engineering								
Date of commencement of studies	February 2024		Academic year of realisation of subject			2024/2025			
Education level	second-cycle studies		Subject group			Optional subject group Subject group related to scientific research in the field of study			
Mode of study	Part-time studies		Mode of delivery			blended-learning			
Year of study	1		Language of instruction			Polish			
Semester of study	2		ECTS credits			4.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Division of Materials Science and Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology								
Name and surname	Subject supervisor		dr inż. Michał	dr inż. Michał Landowski					
of lecturer (lecturers)	Teachers		dr inż. Michał Landowski						
			dr inż. Grzegorz Gajowiec						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	18.0	0.0	9.0	9.0		0.0	36	
	E-learning hours included: 18.0								
Learning activity and number of study hours	Learning activity Participation in classes include plan		I didactic Participation in ed in study consultation hours		Self-study SUM		SUM		
	Number of study hours	36		11.0		53.0		100	
Subject objectives	The aim of the course is to familiarize students with the basic issues related to heat treatment and plastic working of construction materials.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K7_W10] possesses knowledge on the methods of technical and economic analysis of industrial systems and optimization of manufacturing systems; is familiar with the general principles of initiating and developing forms of individual entrepreneurship, particularly for innovative projects using the knowledge		has knoweldge and knows rules			[SW3] Assessment of knowledge contained in written work and projects			
	[K7_U07] is able to perform a preliminary economic analysis of the undertaken engineering actions within the range of design, production and operation of machines and technical devices		is able to make a preliminary analysis			[SU5] Assessment of ability to present the results of task			
	[K7_W04] possesses specialized knowledge on design, construction, properties and testing methods of construction materials		hes specialist knowledge			[SW3] Assessment of knowledge contained in written work and projects			

Subject contents	Lecture: Design and modeling of thermo-chemical treatment processes in relation to plastics iron-based metal. Diffusion saturation with non-metallic elements. Nitriding conventional and ionic, selective nitriding. Conventional carburizing, high temperature and ionic. Diffusion saturation with metallic elements. Machining defects thermochemical. Basics of plastic working. Plastic deformation of metals. The influence of plastic deformation on the properties of metals. Classification of plastic working processes. Rolling of metals. Rolling of sections. Rolling of pipes. Forging and ironing. Forging and pressing machines. Open-die forging. Die forging. Classification of forgings. Drawing and extrusion. Characteristics of drawing and extrusion processes. Drawing machines. Extrusion presses. Technology for drawing bars, wires and pipes. Technology of extrusion processes. Classification of pressing processes. Metal cutting. Metal bending. Multiple and simultaneous pressing						
Prerequisites and co-requisites							
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Exam	50.0%	30.0%				
	Laboratory - activity	50.0%	30.0%				
	Project	50.0%	40.0%				
Recommended reading	Basic literature	 Burakowski T., Roliński E., Wierzchoń T.: Inżynieria powierzchni metali. WPW, Warszawa 1992. Jarzębski M.Z.: Dyfuzja w metalach. Śląsk. Katowice 1976. Praca zbiorowa.: Metaloznawstwo. Skrypt Politechniki Gdańskiej, Gdańsk 1991. Poradnik inżyniera. Obróbka cieplna stopów żelaza. WNT, Warszawa 1977. 					
	Supplementary literature	1. Askeland. D, Phules P.: The science and engineering of materials. Thomson 2008					
	eResources addresses	Adresy na platformie eNauczanie:					
		Modelowanie procesów obróbki cieplnej i plastycznej materiałów, PG_00059373,W/L/P,MiBM NST, II stopień, sem. 02, zimowy 24/25 - Moodle ID: 41731 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=41731					
Example issues/ example questions/ tasks being completed	1. Quenching and tempering process						
	Annealing Design of the heat treatment process 4. Design of the plastic forming process						
Work placement	Not applicable						

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