



Subject card

Subject name and code	Fundamentals of Surface Engineering, PG_00039740						
Field of study	Materials Engineering, Materials Engineering, Materials Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2023/2024		
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			1.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Zakład Technologii Biomateriałów -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Beata Majkowska-Marzec				
	Teachers		dr inż. Beata Majkowska-Marzec				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	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	15		2.0		8.0	25
Subject objectives	Acquainting with the structure of surface layers and coatings, as well as with the modification techniques of surface layers of metal materials. The characteristics, advantages and disadvantages of individual layers and coatings produced in a different way. Possibility of application to specific elements.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W06	The student is able to select the surface modification method for a specific application.			[SW1] Assessment of factual knowledge		
	K6_K01	The student is aware of the need to improve his qualifications. Is able to cooperate with group members. He can inspire other people, knows when to turn to a person with more knowledge.			[SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills		
	K6_W07	The student has knowledge of specific methods of modification of surface layers and the properties of the obtained layers.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	K6_U06	The student is able to determine the type of connection of the coating with the substrate and determine its influence on the properties.			[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		
Subject contents	The concept of the surface layer and the coating and the surface layer. The methods and techniques for producing surface layers. Strengthening techniques using the phenomenon of metal materials in the cold work processes. Chemical and electrolytic methods for preparation metal coatings. Theoretical basis of thermo-chemical treatment and technology diffusion saturation of steel with non-metals and metals. Spraying gas, arc, plasma and detonation. Glow discharge treatment techniques and their application. The processes of preparation of coatings from the vapor phase. Modification of the surface of biomaterials.						
Prerequisites and co-requisites	No requirements						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		written test	60.0%
Recommended reading	Basic literature	1. Burakowski T., Wierzchoń T.: Inżynieria powierzchni metali. WNT Warszawa 1995. 2. Praca zbiorowa pod redakcją Stanisława Tkaczyka.: Powłoki ochronne. Gliwice 1994. 3. Klimpel A.: Napawanie i natryskiwanie cieplne. Technologie. WNT Warszawa 2000. 4. Kula P.: Inżynieria warstwy wierzchniej. Wyd. Politechniki Łódzkiej, Łódź 2000. 5. Kusiński J.: Lasery i ich zastosowanie w inżynierii materiałowej. Kraków, Wyd. Naukowe Akapit 2000.	
	Supplementary literature	1. Wranglen G.: Podstawy korozji i ochrony metali. WNT Warszawa 1985.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	1. Methods of surface engineering used to increase corrosion resistance. 2. Surface engineering methods used to enhance the tribological wear resistance.		
Work placement	Not applicable		