



## Subject card

Subject name and code	Surface Machining Technology, PG_00055509										
Field of study	Mechanical 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			2.0						
Learning profile	general academic profile	Assessment form			assessment						
Conducting unit	Department of Materials Engineering and Bonding -> Faculty of Mechanical Engineering and Ship Technology										
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Beata Majkowska-Marzec									
	Teachers										
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM				
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30				
	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	30	2.0		18.0		50				
Subject objectives	The aim of the course is to familiarize students with technologies of manufacturing of surface layers and protective coatings and assessment of selected properties of the modified surface.										
Learning outcomes	Course outcome	Subject outcome			Method of verification						
	[K6_W03] possesses and is able to practically apply the knowledge on the construction, properties and testing methods of construction materials	The student knows the most important trends in material engineering and is able to connect the acquired knowledge in the field of surface engineering with other fields of engineering knowledge.			[SW1] Assessment of factual knowledge						
	[K6_U09] is able to plan the manufacturing, assembly and quality control processes of typical constructions and mechanical devices, estimating their costs	The student is able to choose the production method and the type of protective coating or top layer in the context of the protection of the structure against external or operational factors.			[SU4] Assessment of ability to use methods and tools						
Subject contents	LECTURE Methods and techniques of forming surface layers. Chemical and electrolytic forming methods of the metallic coatings. Chosen production technology of the steel saturation by metallic and non-metallic elements. Creating of the coatings from gaseous phase and their application. Forming the surface layers by the laser, CVD, PVD and PLD treatments. LABORATORY Coatings fabricated by electrochemical method. Production technology of the immersed and sprayed coatings. Coatings created by thermo-chemical treatment. Advanced the surface layers.										
Prerequisites and co-requisites	Knowledge of the subject: Fundamentals of Materials Engineering I and II										
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade						
	Written exam	56.0%			60.0%						
	Practical exercise	56.0%			40.0%						
Recommended reading	Basic literature	1. Burakowski T., Wierchoń T.: Inżynieria powierzchni metali. WNT Warszawa 1995. 2. Praca zbiorowa pod redakcją Stanisława Tkaczyka.: Powłoki ochronne. Gliwice 1994. 3. Kula P.: Inżynieria warstwy wierzchniej. Wyd. Politechniki Łódzkiej, Łódź 2000. 4. Kusiński J.: Lasery i ich zastosowanie w inżynierii materiałowej. Kraków, Wyd. Naukowe Akapit 2000. 5. Klimpel A.: Napawanie i natryskiwanie cieplne. Technologie. WNT Warszawa 2000.									

	Supplementary literature	1. Dobrzański L.A.: Podstawy nauki o materiałach i metaloznawstwo. Materiały inżynierskie i podstawy projektowania materiałowego. WNT. 2002.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. What is the difference between the protective coating and the top layer?  2. List the steps in the thermal spray process.	
Work placement	Not applicable	