



Subject card

Subject name and code	Metals and Alloys, PG_00061915						
Field of study	Materials Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject				2024/2025	
Education level	first-cycle studies	Subject group				Obligatory subject group in the field of study 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	2	Language of instruction				Polish	
Semester of study	4	ECTS credits				3.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Corrosion and Electrochemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Stefan Krakowiak					
	Teachers	dr hab. inż. Stefan Krakowiak dr hab. inż. Michał Szociński dr hab. inż. Andrzej Miszczyk					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	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 provide students with knowledge in the field of: ferrous and non-ferrous metals and their alloys, internal structure, basic functional properties and resistance to degradation.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W03] Has knowledge of materials science and can relate the properties of materials with their structure and composition, knows the theoretical description of phenomena occurring in materials subjected to external factors.	The student is able to determine the resistance of a material under given operating conditions.			[SW1] Assessment of factual knowledge		
	[K6_K01] Understands the need to improve professional and personal competencies; is conscious of own limitations and knows when to turn to experts, properly establishes priorities helping to accomplish tasks defined by oneself or others.	The student is aware of the need to supplement his or her information regarding the properties of new metal alloys.			[SK5] Assessment of ability to solve problems that arise in practice		
	[K6_U06] Can integrate obtained information, interpret it and draw conclusions, as well as formulate and justify opinions.	The student is able to determine the resistance of a material under given operating conditions.			[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_U02] Can operate typical laboratory equipment and analyze material tests	The student is able to plan the time and subsequent steps necessary to evaluate the microstructure and basic properties of structural metals and alloys.			[SU4] Assessment of ability to use methods and tools		

Subject contents	Lecture: Structure of metals and alloys. Metallographic structures. Iron-carbon diagram. Iron alloys. Steels, cast irons, stainless steels, special purpose steels. Non-ferrous metals. Technical alloys. Discussion of the most important alloys of copper, nickel, zinc, cobalt, Marking of metal alloys; Surface layer and surface layer. Electrochemical and chemical corrosion. Passivity and passivation. Techniques for producing surface layers. Metal coatings - types, applications, importance. Plating. Laboratories: Physical properties of metals; Preparation of metallographic microsections; Metallographic structures; Corrosion of stainless steels; Metal coatings, obtaining and properties; Analysis of micro- and macro-damage to metals and alloys; Conversion coatings. Methods of increasing the resistance of metals and alloys - alloy additives, protective coatings		
Prerequisites and co-requisites	Knowledge of the basics of physics and chemistry.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Passing the subject	100.0%	50.0%
	Passing the laboratory	60.0%	50.0%
Recommended reading	Basic literature	Available on e-corrosion	
	Supplementary literature	Available on e-corrosion	
	eResources addresses	Podstawowe https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44983 - The e-korozja platform contains lecture materials and materials related to the work performed during the course. Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Preparation of metallographic sections; Corrosion of nickel alloys; Copper production.		
Work placement	Not applicable		

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