



Subject card

Subject name and code	Basic of Materials Engineering II, PG_00039791						
Field of study	Materials Engineering, Materials Engineering, Materials Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject				2022/2023	
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	3	ECTS credits				6.0	
Learning profile	general academic profile	Assessment form				exam	
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. Grzegorz Gajowiec				
	Teachers		dr inż. Grzegorz Gajowiec dr inż. Łukasz Pawłowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	45.0	0.0	0.0	60
	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	60		15.0		75.0	150
Subject objectives	To acquaint students with issues related to the features and application of iron alloys and their heat and thermo-chemical treatment.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	K6_U01		Can assess the microstructures and make the necessary calculations.			[SU3] Assessment of ability to use knowledge gained from the subject	
	K6_K01		He is aware of the difficulties involved in analyzing microstructures.			[SK2] Assessment of progress of work	
	K6_W03		Based on the observation of the microstructure, the student can recognize the type of steel and the type of processing it has been subjected to.			[SW1] Assessment of factual knowledge	
	K6_W06		He can prepare metallographic specimens and assess their microstructure			[SW1] Assessment of factual knowledge	
Subject contents	Iron-carbon alloys - types. Characteristics and application of white and graphite cast irons. Classification, marking and application of non-alloy and alloy steels. Heat treatment of steels - annealing, hardening and tempering. Issues of hardenability and its importance. The influence of alloying elements on the properties of steel. Characteristics of structural, corrosion-resistant and tool steel alloys. Heat and chemical treatment of steel.						
Prerequisites and co-requisites	Completion of the Fundamentals of Materials Science course I.						
Assessment methods and criteria	Subject passing criteria		Passing threshold			Percentage of the final grade	
	credit laboratory and written exam		75.0%			100.0%	

Recommended reading	Basic literature	1. Podstawy materiałoznawstwa po redakcją M. Głowackiej i A. Zielińskiego, wydawnictwo PG, Gdańsk 2014  2. Głowacka M. (red.). Metalozawstwo, Politechnika Gdańska, Gdańsk, 1996
	Supplementary literature	1. Ashby F.A., Jones D.R.: Materiały inżynierskie. Tom I i II. WNT, Warszawa, 1995. 2. Callister W.D.: Materials Science and Engineering. Wiley and Sons, 2000-2006. 3. Dobrzański L.A.: Metalowe materiały inżynierskie. WNT, Warszawa, 2004.  4. Ashby F.A., Shercliff H., Cebon D.: Inżynieria materiałowa. Tom 1 i 2. Galaktyka 2011
	eResources addresses	Adresy na platformie eNauczanie: Podstawy Inżynierii Materiałowej II, W, IM, sem. 03, zimowy 22/23 - Moodle ID: 26338 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=26338">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=26338</a>
Example issues/ example questions/ tasks being completed	<p>[1] Definition of steel and classification criteria.  [2] How does the eutectoid transformation affect the grain size in steel?  [3] How alloying additives affect:  - steel structures  - hardenability of steel  - steel resistance to corrosion?  [4] Definition of cast iron. How does the form of coal occurrence affect the properties of cast irons?  [5] What is cast iron, according to what criteria can it be classified.  [6] What are ductile cast irons characterized by and where are they used.  [7]. What is heat treatment and what are its basic types.  [8] What is the hardenability of steel, what factors and how do they affect it, and what is its practical significance?  [9] What structures are obtained after hardening the steel. What are they characterized by?  [10] Explain the terms:  -critical hardening speed  - critical diameter D50 and D90.</p>	
Work placement	Not applicable	

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