

GDAŃSK UNIVERSITY

Subject card

Subject name and code	Material Science II, PG_00033417								
Field of study	Mechatronics, Mechatronics								
Date of commencement of studies	October 2020	October 2020		Academic year of realisation of subject			2020/2021		
Education level	first-cycle studies		Subject gro	Subject group			Obligatory subject group in the field of study		
							ct group related rch in the field c	to scientific of study	
Mode of study	Full-time studies	Full-time studies		livery		at the	university		
Year of study	1	1		Language of instruction					
Semester of study	2		ECTS credits			3.0			
Learning profile	general academic pro	ofile	Assessmer	nt form		assess	sment		
Conducting unit	Department of Materials Engineering and Bonding -> Faculty of Mechanical Engineering and Ship Technology								
Name and surname	Subject supervisor		prof. dr hab. ir	ıż. Dionizy Cze	ekaj				
of lecturer (lecturers)	Teachers		prof. dr hab. ir	nż. Dionizy Cze	ekaj				
			dr inż. Magda	Rościszewska	а				
			Dorota Rogala-Wielgus						
			mgr inż. Ewa Kozłowska						
			dr inż. Tomasz Seramak						
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	:t	Seminar	SUM	
of instruction	Number of study hours	15.0	0.0	30.0	0.0		0.0	45	
	E-learning hours included: 0.0								
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=12402								
	Materiałoznawstwo II (M:31386W1) - Moodle ID: 12402 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=12402								
	Additional information: Laboratory classes:								
	https://enauczanie.pg.edu.pl/moodle/course/view.php?id=12403								
Learning activity and number of study hours	Learning activity	Participation ir classes includ plan	n didactic ied in study	idactic Participation in in study consultation hours		Self-st	udy	SUM	
	Number of study hours	45		5.0		25.0		75	
Subject objectives	To explain students some key issues in the field of Materials Science.								
Learning outcomes	Course out	come	Subj	ect outcome		 '	Method of verif	ication	
	K6_U03		The student ki appreciate the education in o her skills	The student knows and can appreciate the role of self- education in order to improve his/ her skills			Assessment of a e information	ability to	
	K6_W05		The Student has basic knowledge in the field of Materials Science			[SW1] / knowle	Assessment of dge	factual	
	K6_U01		The Student is able to independently access the source information using library catalogues - both analog and digital			[SU4] Assessment of ability to use methods and tools			

Subject contents	Engineering materials. Properties of engineering materials: economic, mechanical, non-mechanical volumetric properties, surface properties, production, aesthetic; price and availability of materials. Phase diagrams. Phase equilibrium systems; Gibbs rule of phases; Two-component equilibrium systems; Phase equilibrium system with unlimited solubility of components in the solid state; Phase equilibrium systems; Weight fraction of phases - the rule of leverage; The "iron - carbon" equilibrium system; TTT charts; diffusion transformation; bainite transformation; martensitic transformation. Heat treatment of steel; Hardening; tempering; temper brittleness; temper; annealing; surface treatment. Metals and their alloys. Steels: ingredients; pollutions; alloying elements in steel; the influence of alloying elements on the properties of steel; Steel types: construction steels; tool steels; steels with special properties. Cast iron; Non-ferrous alloys: Al alloys; Cu alloys; Ni and Co alloys; Ti alloys. Ceramics and glass. Modern (advanced) ceramic materials; Refractory materials. Ceramic abrasives; Glass and glass-ceramics. Thermoplastic polymers (thermoplastics); Thermosetting polymers; Elastomers (rubbers). Properties of polymers. Fibrous composites; Aggregate composites: concrete, sintered carbides; Comparisons of mechanical properties of composites and metal alloys.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade				
	Laboratory classes	100.0%	50.0%				
	Colloquium from the lecture	51.0%	50.0%				
Recommended reading	Basic literature	 Michael Ashby, Hugh Shercliff and David Cebon, Materials Engineering, Science, Processing and Design, Elsevier Ltd, 2007 Michael Ashby, David Jones, Engineering Materials 1, An Introduction to Properties, Applications, and Design, Elsevier Ltd, 2012 Michael Ashby, David Jones, Engineering Materials 2, An Introduction to Microstructures and Processing, Elsevier Ltd, 2013 					
	Supplementary literature	 W. D. Callister, Jr., Materials science and engineering, an introduction, 7th ed., Wiley, 2007, A.J. Moulson, J.M. Herbert, <i>Electroceramics, Materials Properties</i> and Applications, Chapman and Hall, 1990 R. Pampuch, An Introduction to Ceramics, Springer International Publishing Switzerland, 2014 					
	eResources addresses	Materiałoznawstwo II (M:31386W1) - Moodle ID: 12402 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=12402					
Example issues/ example questions/ tasks being completed	 Properties of engineering materials Phase equilibrium systems TTT charts. Non-ferrous alloys Modern (advanced) ceramic materials 						
Work placement	Not applicable						