



Subject card

Subject name and code	Metal science, PG_00056149						
Field of study	Transport and Logistics						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2021/2022		
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	1	Language of instruction			Polish no comments		
Semester of study	1	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Milena Supernak					
	Teachers	dr inż. Milena Supernak mgr inż. Lech Nadolny					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	E-learning hours included: 0.0 Adresy na platformie eNauczenie:						
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	50.0	100		
Subject objectives	Presentation of the field of technical knowledge which is materials science. To acquaint the student with the structure of metals and their alloys. Determination and study of the structure of metals. Examination of mechanical and physical properties of iron alloys and non-ferrous metal alloys, such as aluminum and copper.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W03] has a basic knowledge on hydromechanics, thermodynamics, machine construction, ecology, materials science and electronics necessary to understand the construction and operation principles of means of marine transport	The student analyzes the relationship between the production, structure, properties and functionality of the material.			[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		
	[K6_U05] can formulate a simple engineering task and its specification within the range of design, construction and operation of means and systems of transport	Student defines the properties of materials. The student identifies the basic properties of metallic materials. The student identifies the types of research on the crystal structure: macroscopic and microscopic. Student defines phase and structural components of Fe-C alloys. Student defines iron alloys as well as aluminum alloys and copper alloys.			[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
Subject contents	1. Materials and their importance in technology. Characteristics of the main groups of materials. 2 .. Characteristics of solids. Structure of materials. Structure defects. 3.. Construction of metal alloys. 4. Phase equilibrium systems. The iron-carbon system. 5. Iron-carbon alloys. 6. Heat treatment. Thermo-chemical treatment. 7. Alloy steels. 8. Standardization, classification and marking systems for steel and cast iron. 9. Copper and copper alloys. 10. Aluminium and aluminum alloys. 11. Bearing Alloys. 12. Degradation of metal materials						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Credit for the laboratory - participation, tests and reports on the completed topics	60.0%	50.0%
	Passing the content of the lecture - written form	60.0%	50.0%
Recommended reading	Basic literature	<ul style="list-style-type: none"> • Głowacka M., Zieliński A. : Fundamentals of Materials Science. WPG, Gdańsk 2011 • Dobrzański L.A. : Fundamentals of materials science and metallurgy .. WNT, Warsaw, 2002. 	
	Supplementary literature	<ul style="list-style-type: none"> • Dobrzański L.A. : Metal engineering materials, WNT Warsaw 2004 • Dobrzański L.A. : Engineering materials and material design, WNT Warsaw 2006 	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<p>1. Macro and microscopic research 2. Analysis of the structures of the iron-carbon system 3. Tests of iron alloys (cast steel, cast iron, unalloyed steels) 4. Alloy steels 5. Research on copper and its alloys 6. Tests of aluminum and aluminum alloys</p>		
Work placement	Not applicable		