



## Subject card

Subject name and code	Construction Materials, PG_00060637						
Field of study	Transport and Logistics						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2023/2024		
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		
Semester of study	2	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
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	mgr inż. Alicja Bera dr hab. inż. Leszek Matuszewski dr inż. Milena Supernak dr inż. Paulina Strąkowska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	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	5.0		60.0		125
Subject objectives	Presentation of knowledge in the field of metal science and materials science, taking into account selected technological aspects. To familiarize students with materials used in the construction of floating and ocean engineering facilities. Acquiring the ability to analyze structural phenomena and effects occurring in selected material groups that determine their functional properties.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_K01] is aware of the need for continuous improvement in the field of the profession and knows the possibilities of further education	The student analyzes the relationship between the production, structure, properties and functionality of the material.			[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work [SK1] Assessment of group work skills		
	[K6_U05] can formulate a simple engineering task and its specification in the field of design, maintenance and operation of transport means and systems	The student knows the general principles of material selection in engineering design, knows the regulations regarding materials and structures and is able to use them both in design and in production supervision.			[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
	[K6_W03] has well structured knowledge of hydromechanics, thermodynamics, machine construction, ecology, material science and electrical engineering necessary to understand the principles of construction and operation of means of water transport	the student has sufficient knowledge of materials science and is able to integrate it with knowledge from other teaching subjects in order to use it in a comprehensive process of designing a structure or technological process based on sustainable development			[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation		

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. Structure of metal alloys. 4. Phase equilibrium systems. Iron-carbon system. 5. Iron-carbon alloys. 6.Heat treatment. Thermo-chemical treatment. 7. Alloy steels. 8. Standardization and classification and marking systems for steel and cast iron. 9.Copper and copper alloys. 10.Aluminum and aluminum alloys. 11. Bearing Feet.12. Degradation of metal materials. 13. Polymer materials. 14. Composite materials. 15. Ceramic Materials. 16. Corrosion of materials. 17. Basics of material design		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Participation in the laboratory	60.0%	50.0%
	Written examination	60.0%	50.0%
Recommended reading	Basic literature	<ul style="list-style-type: none"> <li>• Głowacka M., Zieliński A.: Fundamentals of Materials Science. WPG, Gdańsk 2011</li> <li>• Dobrzański L.A.: Basics of materials science and metal science.. WNT, Warsaw, 2002</li> </ul>	
	Supplementary literature	<p>Dobrzański L.A.: Metal engineering materials, WNT Warszawa 2004  Dobrzański L.A.: Engineering materials and material design, WNT Warszawa 2006  M. Blicharski: Introduction to materials engineering, WNT, Warsaw 2001  Ciszewski A. et al.: Materialoznawstwo, Oficyna ed. Warsaw University of Technology, Warsaw 2006  PRS - Regulations for the classification and construction of maritime yachts</p>	
	eResources addresses	Adresy na platformie eNauczanie:	

<p>Example issues/ example questions/ tasks being completed</p>	<ol style="list-style-type: none"> <li>1. Charakterystyczne cechy metali</li> <li>2. Podział metali wg kryterium ciężaru i temperatury topnienia</li> <li>3. Elementy struktury materiałów</li> <li>4. Rodzaje wiązań w materiałach</li> <li>5. Definicja fazy oraz roztworu stałego</li> <li>6. Pojęcie mieszaniny eutektycznej i eutekoidalnej.</li> <li>7. Składniki fazowe i strukturalne w układzie Fe-C.</li> <li>8. Przemiana eutekoidalna</li> <li>9. Przemiana eutektyczna</li>   <li>10. Stal podeutekoidalna, stal eutekoidalna, stal nadeutekoidalna</li>   <li>11. Martenzyt i przemiana martenzytyczna.</li>   <li>12. Sposoby wyżarzania z przemianą alotropową.</li>   <li>13. Sposoby wyżarzania bez przemiany alotropowej.</li>   <li>14. Sposoby hartowania.</li>   <li>15. Sposoby odpuszczania.</li>   <li>16. Od czego zależy temperatura wyżarzania, dla stali niestopowych?</li>   <li>17. Wykresy CTP; podaj przykład dla stali.</li>   <li>18. Degradacja korozyjna stali austenitycznych</li>   <li>19. Stan pasywny stali</li>   <li>20. Żarowytrzymałość i żaroodporność.</li> </ol>
<p>Work placement</p>	<p>Not applicable</p>