GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Construction materials, PG_00060523		
Field of study	Naval Architecture and Offshore Structures		
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	1	ECTS credits	6.0
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	dr inż. Milena Supernak dr inż. Paulina Strąkowska mgr inż. Alicja Bera dr hab. inż. Leszek Matuszewski	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	45.0	0.0	30.0	0.0	0.0	75

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	75	8.0	67.0	150

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_W03] has knowledge of hydromechanics, thermodynamics, machine design, ecology, materials science necessary to understand the principles of construction and operation of ocean engineering facilities and equipment	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 [SW1] Assessment of factual knowledge
[K6_U05] can formulate a simple engineering task and its specification within the range of design, construction and operation of ocean technology objects 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.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject

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	• Głowacka M., Zieliński A.: Fundamentals of Materials Science. WPG, Gdańsk 2011 • Dobrzański L.A.: Basics of materials science and metal science.. WNT, Warsaw, 2002
	Supplementary literature	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
	eResources addresses	Adresy na platformie eNauczanie: Materiały konstrukcyjne_W_L_PG_00060523_ OiKM - Moodle ID: 31478 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31478

Example issues/ example questions/ tasks being completed	1. Charakterystyczne cechy metali 2. Podział metali wg kryterium ciężaru i temperatury topnienia 3. Elementy struktury materiałów 4. Rodzaje wiązań w materiałach 5. Definicja fazy oraz roztworu stałego 6. Pojęcie mieszaniny eutektycznej i eutektoidalnej. 7. Składniki fazowe i strukturalne w układzie Fe-C. 8. Przemiana eutektoidala 9. Przemiana eutektyczna 10. Stal podeutektoidalna, stal eutektoidalan, stal nadeutektoidalna 11. Martenzyt i przemiana martenzytyczna. 12. Sposoby wyżarzania z przemianą alotropową. 13. Sposoby wyżarzania bez przemiany alotropowej. 14. Sposoby hartowania. 15. Sposoby odpuszczania. 16. Od czego zależy temperatura wyżarzania, dla stali niestopowych? 17. Wykresy CTP; podaj przykład dla stali. 18. Degradacja korozyjna stali austenitycznych 19. Stan pasywny stali 20. Żarowytrzymałość i żaroodporność.
Work placement	Not applicable