



## Subject card

Subject name and code	Materials science, PG_00044528						
Field of study	Transport						
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		
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			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Agata Lisińska-Czekaj					
	Teachers	dr inż. Artur Sitko dr hab. Agata Lisińska-Czekaj					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	0.0	45
	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	45	5.0		25.0		75
Subject objectives	The aim of the course is to familiarize students with the basic issues of material science.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W03] has basic knowledge of hydromechanics, thermodynamics, machine design, materials science and electrical engineering required for understanding the principles of construction and operation of means of transport	The student knows the methods, techniques, tools and special materials used to construct means of transport.			[SW1] Assessment of factual knowledge		
	[K6_U09] able to, when formulating and solving engineering problems in transport, use the right methods and devices to carry out measurements of basic values and parameters used in transport, carry out stress tests of structures, select the right materials, select elements of devices	Student explains the principles of material selection in industry. Analyzes the main groups of selected materials, taking into account the conditions operation.			[SU4] Assessment of ability to use methods and tools		
Subject contents	Genesis of materials science. Classification of materials and examples of division criteria: chemical composition, structure, application, manufacturing process. New technologies for implementation in the 21st century. Overview of the main groups of engineering materials: metals and their alloys, polymers, ceramic materials, composite materials - construction, manufacturing methods, properties, application. Solid structure. Basics of crystallography - elements of a spatial network, crystallographic systems. Chemical bonds and their characteristics. Structural defects and their types. Phase equilibrium systems. Steels, cast steel, cast iron - classification, designation, application. Basics of heat treatment. Steel heat treatment. Mechanical, electrical, optical, thermal and magnetic properties of materials. Material degradation (corrosion, cavitation, cracking). Biomimetic, intelligent and functional materials.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	written colloquium	51.0%			50.0%		
	written colloquium	51.0%			50.0%		

Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Ashby M., Jones D., Materiały inżynierskie. Tom I Właściwości i zastosowanie. WNT, Warszawa 1995</li> <li>2. Ashby M., Jones D., Materiały inżynierskie. Tom II Kształowanie struktury i właściwości, dobór materiałów. WNT, Warszawa 1996</li> <li>3. Blicharski M., Wstęp do inżynierii materiałowej. WNT, Warszawa 2004</li> <li>4. Blicharski M., Inżynieria materiałowa. Stal. WNT, W-wa 2004.</li> <li>5. Dobrzański L.A., Podstawy nauki o materiałach i metaloznawstwo. WNT, Gliwice-Warszawa 2002</li> <li>6. Dobrzański L.A., Metaloznawstwo z podstawami nauki o materiałach. WNT Warszawa 1996</li> <li>7. Dobrzański L. A., Podstawy nauki o materiałach i metaloznawstwo. Materiały inżynierskie z podstawami projektowania materiałowego., WNT Warszawa, 2002</li> <li>8. Ashby M., Shercliff H., Cebon D., Inżynieria materiałowa, T1, T2, Wydawnictwo Galaktyka, Łódź, 2011</li> <li>9. Pampuch R., Współczesne materiały ceramiczne, Wydawnictwo AGH, Kraków 2005</li> <li>10. Głowacka M., Zieliński A. (Red). Podstawy materiałoznawstwa, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2014</li> <li>11. Boczkowska A., Krzesiński G., Kompozyty i techniki ich wytwarzania, Oficyna Wydawnicza Politechniki Warszawskiej, 2016</li> <li>12. Królikowski W., Polimerowe kompozyty konstrukcyjne, PWN, Warszawa, 2012</li> </ol>
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Dobrzański L.A., Metalowe materiały inżynierskie. WNT Warszawa 2004.</li> <li>2. Grabski W., Kozubowski J., Istota inżynierii materiałowej geneza, istota, perspektywy. Oficyna Wyd. Politechniki Warszawskiej, Warszawa 2003.</li> <li>3. Praca zbiorowa pod red .M. Głowackiej, Metaloznawstwo. Wyd. Politechniki Gdańskiej, Gdańsk 1996.</li> <li>4. Prowans S., Metaloznawstwo. PWN, W-wa 1988.</li> <li>5. Przybyłowicz K., Metaloznawstwo. WNT, Warszawa 2003.</li> </ol>
	eResources addresses	<p>Adresy na platformie eNauczenie:</p> <p>Nauka o materiałach, W, Transport, sem.02, letni 23/24 - Moodle ID: 37302  <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37302">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37302</a></p> <p>Nauka o materiałach, W, Transport, sem.02, letni 23/24 - Moodle ID: 37302  <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37302">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37302</a></p>
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Classification of basic groups of materials and their characteristics and examples.</li> <li>2. Defects, their types and mechanisms of creation.</li> <li>3. Elements of the spatial network. Crystallographic systems.</li> <li>4. Explain the concept of steel, steel classification criteria (PN), steel division.</li> <li>5. Materials properties.</li> </ol>	
Work placement	Not applicable	