GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Designing and selection materials of construction, PG_00050173		
Field of study	Mechanical Engineering		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Artur Sitko	
	Teachers	dr inż. Artur Sitko	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0	0.0	30

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	30	8.0	62.0	100

Subject objectives

Knowledge of concepts and methods of material selection in practical applications.Understand the relationship between design requirements and material properties.The ability to select materials for specific elements

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W03] possesses and is able to practically apply the knowledge on the construction, properties and testing methods of construction materials	The student knows the methods of producing materials from various material groups, as well as the conditions of their operation, and is able to select the appropriate material for a specific application.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_W08] possesses basic knowledge including the methodology of designing machine parts, mechanical devices, selection of construction materials, manufacturing and operation, with the lifetime cycle	The student defines basic material groups; identifies the features of individual material groups; explains the differences in their properties based on their microstructure.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_U10] is able to formulate the principles of selecting a material for a construction, ensuring the correct operation of a device	The student is able to analyze the material in terms of its functions in a given application; determine the necessary material properties of the product; determine their validity; determine/designate material indexes.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment

Subject contents

The role of material design in the design of engineering products and their manufacturing processes. Elements and phases of engineering design. Principles of material selection - basic properties of individual material groups. Functional, sociological, ecological and economic factors in the selection of materials. Selection support systems and material databases. Selection examples.Examples of material selection in various applications due to their properties: mechanical, thermal, corrosion resistance, etc. Selection of materials depending on the shape of the element in various practical applications.and:Structural composites with a metal matrix (including: Ability to select materials for specific elements); Fibrous structural composites (including: Ability to select appropriate reinforcement/material for specific applications); The impact of laser processing on the properties of selected acid-resistant steel and its potential applications in specific applications; The influence of heat treatment on the properties and applications of selected alloy steel

Prerequisites and co-requisites

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		50.0%	50.0%
		50.0%	50.0%
Recommended reading	Basic literature	1. Ashby M.F.: Selection of materials in engineering design. WNT. Warsaw 19982. Ashby M.F., Jones D.R.H.. Engineering materials - Properties and applications - volume 1. WNT, Warsaw 19963. Ashby M.F., Jones D.R.H.. Engineering materials - Shaping the structure and properties of materials - volume 2. WNT, Warsaw 19985. Instructions (prepared by PG, entitled: Composite materials: Dr. hab. Eng. K. Imielińska)6. Collective work: Metal science. Materials for laboratory exercises. Gdańsk University of Technology script. Gdańsk, 19957.Website:https://rcin.org.pl/Content/7592/ WA727_21529_57370-3-2011 Laser modification(website current as of August 22, 2022)	
	Supplementary literature	Dobrzański L.A.: Principles of selecting engineering materials: with safety data sheets. Gliwice, Publishing house of the Silesian University of Technology, 2000	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		