



Subject card

Subject name and code	Material Behaviour During Joining and Exploitation, PG_00039923						
Field of study	Mechanical Engineering, Mechanical Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
Education level	first-cycle studies	Subject group			Optional subject group 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	3	Language of instruction			Polish Lack		
Semester of study	6	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Materials Engineering and Bonding -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Grzegorz Rogalski					
	Teachers	dr hab. inż. Grzegorz Rogalski dr inż. Aleksandra Świerczyńska mgr inż. Adrian Wolski mgr inż. Anna Janeczek					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	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	6.0		24.0		75
Subject objectives	The aim of the course is to familiarize students with the weldability of selected material groups (e.g. stainless steels, titanium and its alloys, aluminum and aluminum alloys, copper and its alloys, steels with high yield point and others) using various types of processes. Mechanisms related to various types of cracks in welded joints and methods of their prevention will also be presented.						
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 is able to analyze the influence of the essential variables of the bonding process on the properties of the obtained joints		[SW2] Assessment of knowledge contained in presentation		
	[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 choose the appropriate type of construction material depending on the type of device, operating conditions, and above all, due to the possibility of bonding		[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		
Subject contents	As part of the course, students learn about the welding processes used to connect various types of material groups (structural steels, stainless steels, nickel and its alloys, aluminum and its alloys, titanium, copper and its alloys) and their impact on welding metallurgy and the properties of the obtained joints.						
Prerequisites and co-requisites	Basic knowledge of welding and building construction materials						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Laboratory		60.0%		40.0%		
	Lecture		60.0%		60.0%		

Recommended reading	Basic literature	<p>1. Łabanowski J. : Corrosion-resistant steels and their weldability. Publishing House of the Gdańsk University of Technology, Gdańsk 2020</p> <p>2. Klimpel A. : Welding, welding and cutting of metals. WNT 1999</p> <p>3. Tasak E. : Weldability of Construction Materials, Volume I. Publishing House JAK 2009</p> <p>4. Chmielewski T. : Designing technological processes - welding. Publishing House of the Warsaw University of Technology in 2013</p> <p>5. Nowacki J., Chudziński M., Zmitrowicz P. : Soldering in machine building. Polish Scientific Publishers PWN</p>
	Supplementary literature	Not requires
	eResources addresses	<p>Adresy na platformie eNauczenie:</p> <p>Zachowanie materiałów w czasie spajania i eksploatacji, W, L, MiBM sem. 6 Lato 2022 2023 PG_00039923, - Moodle ID: 30253 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=30253</p>
Example issues/ example questions/ tasks being completed	<p>Give problems related to welding titanium and its alloys Explain the cathodic cleaning phenomenon when welding aluminum and its alloys Give the influence of alloying elements on the properties of construction materials Describe the influence of the thermal cycle of welding on the properties of welded joints Problems with welding aluminum and its alloys</p>	
Work placement	Not applicable	