



## Subject card

Subject name and code	Automation and robotization of welding processes, PG_00055246						
Field of study	Management and Production 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	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish None		
Semester of study	5	ECTS credits			3.0		
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 hab. inż. Grzegorz Rogalski					
	Teachers	dr hab. inż. Grzegorz Rogalski dr inż. Michał Landowski					
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	4.0		26.0	75	
Subject objectives	The aim of the course is to familiarize students with the current state of knowledge in the field of robotization and automation of welding processes and related and accompanying elements.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W06] has knowledge of the life cycle of products and mechanical devices and systems, in the field of machine parts manufacturing techniques, as well as the possibilities and trends in the development of machines and production devices and process control	The student is able to determine the degree of the life cycle of an automated or robotic system and predict the possibility of its modification			[SW2] Assessment of knowledge contained in presentation		
	[K6_K01] feels the need for self-realization by learning throughout life, is looking for modern and innovative solutions in their actions, is able to think creatively and act in an entrepreneurial way	The student is able to identify innovative solutions that allow not to increase the efficiency of welding processes through the application of significant variables of a given process.			[SK5] Assessment of ability to solve problems that arise in practice		
	[K6_U07] is able to conduct a preliminary economical analysis of undertaken engineering activities, is able to can conduct a critical analysis and evaluation of existing production processes and courses of selected sections of manufacturing systems, is able to identify the needs of the application of technical solutions for automation and / or robotization production stations and formulate the specifications of the resulting benefits and limitations	The student is able to make the right choice of the automation and robotization process based on the analysis of input data			[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 the content related to the automation and robotization of welding processes. They get to know the current instrumentation and the requirements for this type of instrument. They will learn how to increase the efficiency of welding.		
Prerequisites and co-requisites	Basic knowledge of welding processes		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	56.0%	50.0%
	Lecture	56.0%	50.0%
Recommended reading	Basic literature	<p>Dobaj E.: Maszyny i urządzenia spawalnicze, WNT Wydawnictwa Naukowo-Techniczne, 2014</p> <p>Pilarczyk J.: Poradnik inżyniera Spawalnictwo Tom 1, Tom 2 Wydanie II, Wydawnictwo: Naukowe PWN, 2017</p> <p>Chmielewski T.: Projektowanie procesów technologicznych spawalnictwo, Oficyna Wydawnicza Politechniki Warszawskiej, 2013</p> <p>Klimpel A.: Technologie laserowe w spawalnictwie, Wydawnictwo Politechniki Śląskiej, Gliwice, 2011</p> <p>Ferenc K.: Podręcznik spawania. Zagadnienia ogólne. Agencja Wydawnicza SIMP, 2018</p>	
	Supplementary literature	Not require	
	eResources addresses	Adresy na platformie eNauczanie: Automatyzacja i robotyzacja procesów spawania, W, L, ZIP, Sem.5, Zima 2023/2024 - Moodle ID: 33865 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33865">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33865</a>	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Give the methods of increasing the efficiency of the MIG / MAG welding process using robotic welding</li> <li>2. Give the methods of automation and robotization of welding with the TIG process</li> <li>3. Explain the principles of building robotic stations with the observance of safety rules</li> <li>4. Provide the methods of manipulating the object welded on the robotic station</li> <li>5. Suggest a method of fixing pipe elements on a mechanized orbital welding stand</li> <li>6. What are the welding positioners for, provide typical solutions</li> </ol>		
Work placement	Not applicable		