GDAŃSK UNIVERSITY OF TECHNOLOGY

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 2025	Academic year of realisation of subject	2027/2028
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
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 -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Grzegorz Rogalski	
	Teachers		

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.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Basic knowledge of welding processes</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Laboratory</td><td>56.0%</td><td>50.0%</td></tr><tr><td>Lecture</td><td>56.0%</td><td>50.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Dobaj E.: Maszyny i urządzenia spawalnicze, WNT Wydawnictwa Naukowo-Techniczne, 2014

Pilarczyk J.: Poradnik inżyniera Spawalnictwo Tom 1, Tom 2 Wydanie II, Wydawnictwo: Naukowe PWN, 2017

Chmielewski T.: Projektowanie procesów technologicznych spawalnictwo, Oficyna Wydawnicza Politechniki Warszawskiej, 2013

Klimpel A.: Technologie laserowe w spawalnictwie, Wydawnictwo Politechniki Śląskiej, Gliwice, 2011

Ferenc K.: Podręcznik spawania. Zagadnienia ogólne. Agencja Wydawnicza SIMP, 2018</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Not require</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">1. Give the methods of increasing the efficiency of the MIG / MAG welding process using robotic welding
2. Give the methods of automation and robotization of welding with the TIG process
3. Explain the principles of building robotic stations with the observance of safety rules
4. Provide the methods of manipulating the object welded on the robotic station
5. Suggest a method of fixing pipe elements on a mechanized orbital welding stand
6. What are the welding positioners for, provide typical solutions</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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