GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Design of welded constructions, PG_00055243		
Field of study	Management and Production Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
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	assessment
Conducting unit	Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Grzegorz Rogalski	
	Teachers		

Lesson types

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	37.0	75

Subject objectives

The aim of the course is to familiarize students with the principles of designing welded structures, including the variables that affect the weldability of construction materials, welding stresses and deformations, and how to minimize the adverse effects of the welding process.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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 determine the construction problem and take action to eliminate them	[SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice
[K6_W03] has knowledge of the design record (the record structure)for the preparation of the manufacturing process documentation and basic knowledge of the implementation and management of production systems, including the principles of designing machine parts and manufacturing technologies using information techniques	The student is able to design a structure with welded joints, taking into account the existing standards and requires	[SW3] Assessment of knowledge contained in written work and projects
[K6_U06] when formulating and solving engineering tasks a student can see aspects of system management and organization of individual and as a team, taking into account the human factor, has necessary peparation for work in an industrial environment, and knows the rules and standards related to occupational health and safety	Based on the obtained information, the student is able to adjust the existing tools and the acquired skills to solve a construction problem	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
[K6_U02] has the ability of self-learning and expanding knowledge in a specialized field of engineering production	The student is able to broaden the knowledge of welded structures on the basis of available information and tools	[SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td>Course content – lecture
As part of the course, students learn the factors determining the weldability of construction materials along with their indicators, types of cracks and methods of their prevention, the impact of the thermal welding cycle on the properties of joints as well as welding deformations and stresses, rules for making joints, including calculations, e.g. using the allowable stress method.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic information on materials science and the basics of machine designe</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<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>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Chmielewski T.: Projektowanie procesów technologicznych spawalnictwo, Oficyna Wydawnicza Politechniki Warszawskiej, 2013

Ferenc J.: Kazimierz Ferenc: Konstrukcje spawane Połączenia, Wydawnictwo Naukowe PWN, WNT, Wydanie 3, 2021

Ferenc J.: Kazimierz Ferenc: Spawalnicze gazy osłonowe i palne, WNT, Warszawa, 2013

Siwek B.: Połączenia spawane, zgrzewane, lutowane i klejone, Wydawnictwo Politechniki Gdańskiej, 2002

Tasak E,: Metalurgia spawania. Wydawnictwo Jak. Kraków, 2008

Normy przedmiotowe</td></tr>
<tr><td>Supplementary literature</td><td>Not rquire</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Explain the influence of the welding process on the formation of welding deformations
2. Characterize the welding thermal cycle depending on the welding process and the number of beads
3. Give the basic principles of calculating stresses in welded joints with butt and fillet welds
4. Explain the reasons for the formation of cold, hot and lamellar cracks
5. Explain the influence of the welding sequence on the formation of welding deformations
6. Give methods of preventing welding distortions</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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