



## Subject card

Subject name and code	Design of Welded Structures, PG_00040094						
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	6		ECTS credits		4.0		
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				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	22.0	0.0	15.0	0.0	0.0	37
	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	37		10.0		53.0	100
Subject objectives	To acquaint students with deepened information on the performance characteristics of the weldment and the formation of welded joints under the influence of static and dynamic loads. The student is able to apply different methods of dimensioning complex structures, working in various environmental conditions. Can also based on an analysis of weldability choose in a systemic way the material for welded structures.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U09] is able to plan the manufacturing, assembly and quality control processes of typical constructions and mechanical devices, estimating their costs		On the basis of the information obtained, the student is able to plan the stages of manufacturing steel structures and estimate the initial production costs.		[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information		
	[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		On the basis of the information obtained, the student is able to adapt the existing tools and acquired skills to solve the construction problem		[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		
	[K6_W11] possesses knowledge on design, technology and manufacturing of machine parts, metrology, and quality control; knows and understands methods of measuring and calculating basic values describing the operation of mechanical systems, knows basic calculating methods applied to analyse the results of experiments		The student is able to combine the aspects of construction, technology and quality control in relation to the production of steel structures.		[SW2] Assessment of knowledge contained in presentation		
Subject contents	Basic concepts and definitions concerning the strength of materials in relation to the welded joints. Elastic and plastic deformation of the material under external load. Types of breakthroughs. Relations between the state of stress and strain. Effects of temperature and type of load on the behavior of the material. Basic principles for the design of welded structures: the method of calculating the stress equilibrium conditions, geometric conditions, compounds physical stress permissible. Characteristics of types of stress: tensile, shear stress, tension membrane formation conditions of stress concentration, multi-axis stress state. Calculation of complex structural design contains butt and fillet welds						

Prerequisites and co-requisites	Basic knowledge of metallurgy, mechanics and strength of materials.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written exam	50.0%	70.0%
	laboratory	100.0%	30.0%
Recommended reading	Basic literature	1. K. Ferenc, J. Ferenc: Projektowanie konstrukcji spawanych" WNT W-wa 2002 - Design of welded structures - in Polish  2. Poradnik inżyniera - Spawalnictwo - T 1, WNT W-wa 2003/ Welding handbook Part one - in Polish  3. J. Augustyn, E Śledziwski: Technologiczność konstrukcji stalowych Arkady W-wa 1981- Producibility of steel construction - in Polish  4. M. Porębska, A. Skorupa: Połączenia spójnościowe, Wyd. Naukowe PWN W-wa 1997 - Welding design - in Polish	
	Supplementary literature	Technical Journals:  1. Welding Journal  2. Metallurgical Transaction A, B  3. Transaction of ASME	
	eResources addresses	Adresy na platformie eNauczanie: Projektowanie konstrukcji spawanych, W, L, MiBM, Sem.6, niestacjonarne I stopień, Lato 2023/2024 - Moodle ID: 36533 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36533">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36533</a>	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		