GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Welding Proceses and Equipment, PG_00039922		
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
Semester of study	6	ECTS credits	4.0
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. Aleksandra Świerczyńska dr inż. Jacek Haras mgr inż. Anna Janeczek	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	45.0	0.0	15.0	0.0	0.0	60

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	60	8.0	32.0	100

Subject objectives

Obtaining of knowledge of welding processes and power sources

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U08] is able to design a technological manufacturing process for typical elements of machines or devices, using analytical and numerical calculating tools	The student is able to choose a joining method (welding, resistance welding, friction welding, soldering, brazing) for a given material group.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
[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	The student is able to critically assess the application of various material technologies.	[SW1] Assessment of factual knowledge

Subject contents	COURSE CONTENT Classification of welding and joining processes. Outline of welding thermal cycles. Basic materials and consumables for welding. Basics of welding technology specification. Gas welding. Manual arc welding (MMA). Submerged arc welding under flux. TIG welding. Shielding gases. Gas-shielded arc welding MIG / MAG methods. Flux cored arc welding. Pulse arc welding. Laser welding, plasma and electron beam welding. Resistance pressure welding, spot and linear pressure welding, upset and flash welding. Basic parameters of the process. Other methods of pressure welding. Thermal cutting methods: oxygen cutting, plasma cutting. Cutting laser beam. Deformation and welding stress and methods for their reduction. Inspection of welded joints, imperfections definitions and methods for their detection. LABORATORY PRACTICAL TRAINING Manual arc welding with coated electrodes, automatic submerged arc welding. Gas-shielded arc welding. Pressure resistance welding. Gas welding and cutting. Structure of welded joints. Imperfections of welded joints
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory	60.0%	40.0%
Exam	60.0%	60.0%

Recommended reading

Basic literature	1. Klimpel A.: Technologia spawania i cięcia metali. Wyd. Politechniki Śląskiej, Gliwice 1997. 2. Walczak W. i inni: Spawalnictwo ćwiczenia laboratoryjne. Wyd. Politechniki Gdańskiej, Gdańsk, 2000. 3. Klimpel A., Mazur M.: Podręcznik spawalnictwa. Wyd. Politechniki Śląskiej, Gliwice 2004. 4. Poradnik Inżyniera Spawalnictwo, tom I i II, WNT Warszawa, 2005
Supplementary literature	1. Ferenc K.: Spawalnictwo. WNT Warszawa 2007. 2. Ferenc K., Ferenc J.: Spawalnicze gazy osłonowe i palne. WNT Warszawa 2005.
eResources addresses	Adresy na platformie eNauczanie: Procesy i urządzenia spajania, W, L, MiBM sem. 6 Lato 2022 2023 PG_00039922, - Moodle ID: 30254 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30254

Example issues/ example questions/ tasks being completed	Describe the method of welding. Describe the method of resistance or friction welding. Describe the method of brazing or soldering. Describe of welding power source.
Work placement	Not applicable