



## Subject card

Subject name and code	Welding Technology, PG_00056427						
Field of study	Ocean Engineering						
Date of commencement of studies	October 2021		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	2		Language of instruction		Polish		
Semester of study	4		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						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Dariusz Fydrych				
	Teachers		dr hab. inż. Dariusz Fydrych  mgr inż. Dariusz Duda				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	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		3.0		27.0	75
Subject objectives	Acquiring knowledge of welding and cutting technologies used in the shipbuilding industry						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W05] has an organized knowledge on design, construction and operation of ocean technology objects and systems		The student is able to use information and technological, material and IT tools.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	[K6_U05] can formulate a simple engineering task and its specification within the range of design, construction and operation of ocean technology objects and systems		The student explains the mechanisms determining the formation of welded joints. The student improves the skills of selecting the appropriate material technologies.		[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
	[K6_U06] in compliance with a formulated specification and with the aid of appropriate tools and methods, is able to complete a simple engineering task within the range of design, construction and operation of ocean technology objects and systems		The student is able to plan and lead projects		[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		

Subject contents	<p>Lecture:</p> <p>Introduction: basic notions. Welding processes. Characteristics and properties of welded joints. Manual metal arc welding. Submerged arc welding. Oxyacetylene welding. Gas metal arc welding (MIG/MAG). Gas tungsten arc welding (TIG). Plasma arc Welding. Laser beam Welding. Electron beam Welding. Resistance welding, Friction Welding, Explosive Welding, Welding of plastics. Soldering and Brazing. Induction soldering, dip soldering, electro-brazing, gas brazing, torch brazing, Furnace brazing. Braze welding. Thermal cutting methods. Quality in welding. Welding defects.</p> <p>Laboratory: Manual metal arc welding. submerged arc welding Gas metal arc welding (MIG/MAG), gas tungsten arc welding (TIG) Resistance and friction welding of metals Oxyacetylene welding, brazing, thermal cutting, gouging Characteristics and properties of welded joints Evaluation of weldability of steel Inspection of quality of welded joints.</p>		
Prerequisites and co-requisites	MetallographyPhysicsMmathematics		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory test	60.0%	40.0%
	Test	60.0%	60.0%
Recommended reading	Basic literature	1. Klimpel A.: Technologia spawania i cięcia metali. WNT. Warszawa 1999. 2. Walczak W. (red.): Spawalnictwo. Ćwiczenia laboratoryjne. Wydawnictwo Politechniki Gdańskiej. Gdańsk, 2000. 3. Butnicki S.: Spawalność i kruchość stali. Wydawnictwo WNT. Warszawa 1991. 4. Pilarczyk J., Pilarczyk J.: Spawanie i napawanie elektryczne metali. Wydawnictwo Śląsk, Katowice 1996. 5. Dobrzański A.L.:Podstawy nauki o materiałach i materiałoznawstwo. Materiały inżynierskie i podstawy projektowania materiałów. WNT. 2002.	
	Supplementary literature	1. Klimpel A.: Napawanie i natryskiwanie cieplne. WNT. Warszawa 2000. 2. Czajkowski H., Walczak W.: Zgrzewanie wybuchowe metali. WNT. Warszawa 1970. 3. Radomski T., Ciszewski A.: Lutowanie. WNT. Warszawa 1971. 4. Burakowski T., Wierzchoń.: Inżynieria powierzchni metali. WNT. Warszawa 1995	
	eResources addresses	Adresy na platformie eNauczanie: Spawalnictwo, Oceanotechnika, I stopnia – inżynierskie, sem. 4, 2022/2023 - Moodle ID: 29497 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29497">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29497</a>	
Example issues/ example questions/ tasks being completed	<p>Describe the welding method.</p> <p>Describe the resistance welding method.</p> <p>Describe the method of soldering</p>		
Work placement	Not applicable		