



## Subject card

Subject name and code	Chipless Process Engineering, PG_00040074						
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	Part-time studies	Mode of delivery				at the university	
Year of study	3	Language of instruction				Polish	
Semester of study	5	ECTS credits				5.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Materials Engineering and Bonding -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Michał Landowski					
	Teachers	dr inż. Michał Landowski dr hab. inż. Dariusz Fydrych dr inż. Aleksandra Świerczyńska					
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						
Technologia procesów bezwłórowych, NST, TMIMK, sem 5, zima 22/23 - Moodle ID: 27138 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=27138">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=27138</a>							
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	11.0		77.0		125
Subject objectives	The student has to know the basis for the production of welded structures, castings and by forming						
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 develop the technological process of products using stamping.			[SU1] Assessment of task fulfilment [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		The student is able to select materials for a specific application.			[SW1] Assessment of factual knowledge	
Subject contents	Introduction: basic notions. Basic concepts regarding the organizational system foundries and plastic processing plant. Forming Technologies. Automation and robotics forming processes. Technical documentation, design and technology. 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: gas cutting, electro-cutting, plasma arc cutting. Gouging. Water jet cutting. Safety of welding work.						

Prerequisites and co-requisites	Basic knowledge of physics and metallurgy		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	laboratory exercises	60.0%	40.0%
	written exam	60.0%	60.0%
Recommended reading	Basic literature	<p>1. Kimpel A.: Spawanie zgrzewanie i cięcie metali, WNT Warszawa 1999</p> <p>2. Collective work edited by W. Walczak Spawalnictwo ćwiczenia laboratoryjne, Wyd. PG, Gdańsk 2000.</p> <p>3. Mizerski Jerzy: "Spawanie w osłonie gazów metodą TIG". Wydawnictwo REA s. j.; Warszawa 2008</p> <p>4. Mizerski Jerzy: "Spawanie w osłonie gazów metodami MAG i MIG". Wydawnictwo REA s. j.; Warszawa 2005</p> <p>5. Murza-Mucha J.: "Odlewnictwo", PWN Warszawa 1987</p> <p>6. Poradnik inżyniera: "Odlewnictwo", WNT Warszawa, 1972</p>	
	Supplementary literature	<p>1. Pilarczyk J. i J. Spawanie i napawanie elektryczne metali, Śląsk, Katowice 1996</p> <p>2. Poradnik Inżyniera Spawalnictwo, t1, t2, t3, WNT, Warszawa 2003.</p>	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<p>Discuss the die design process.</p> <p>Discuss the role of lubricants in plastic forming processes.</p>		
Work placement	Not applicable		