



Subject card

Subject name and code	Chipless Process Engineering, PG_00040074						
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		blended-learning		
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				
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: 22.0						
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		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
	written exam	60.0%	60.0%
	laboratory exercises	60.0%	40.0%
Recommended reading	Basic literature	1. Klimpel A.: Spawanie zgrzewanie i cięcie metali, WNT Warszawa 1999 2. Collective work edited by W. Walczak Spawalnictwo ćwiczenia laboratoryjne, Wyd. PG, Gdańsk 2000. 3. Mizerski Jerzy: "Spawanie w osłonie gazów metodą TIG". Wydawnictwo REA s. j.; Warszawa 2008 4. Mizerski Jerzy: "Spawanie w osłonie gazów metodami MAG i MIG". Wydawnictwo REA s. j.; Warszawa 2005 5. Murza-Mucha J.: "Odlewnictwo", PWN Warszawa 1987 6. Poradnik inżyniera: "Odlewnictwo", WNT Warszawa, 1972	
	Supplementary literature	1. Pilarczyk J. i J. Spawanie i napawanie elektryczne metali, Śląsk, Katowice 1996 2. Poradnik Inżyniera Spawalnictwo, t1, t2, t3, WNT, Warszawa 2003.	
	eResources addresses	Adresy na platformie eNauczanie: Technologia procesów bezwłórowych, PG_00040074,W/L, MiBM NST, sem. 05, zimowy 23/24 - Moodle ID: 33961 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33961	
Example issues/ example questions/ tasks being completed	Discuss the die design process. Discuss the role of lubricants in plastic forming processes.		
Work placement	Not applicable		