



Subject card

Subject name and code	Unconventional production and manufacturing processes (advanced manufacturing process), PG_00059490						
Field of study	Management and Production Engineering						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Obligatory subject group in the field of study 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	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			4.0		
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. Jacek Tomków					
	Teachers	dr hab. inż. Jacek Tomków dr inż. Michał Landowski dr inż. Piotr Sender					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	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	10.0		45.0		100
Subject objectives	Getting to know unconventional and combined methods of manufacturing machine parts, including additive methods and reverse engineering.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W02] has extended knowledge covering key issues characterizing production processes	The student has extended knowledge of non-conventional manufacturing methods. The student selects a manufacturing method according to the expected results of the processing and the processed material.			[SW1] Assessment of factual knowledge		
	[K7_K01] is aware of the need to expand knowledge and verify the methods of solving problems by consulting experts	The student acquires knowledge about non-conventional methods from scientific articles. The student verifies the basic information contained in articles for its usefulness in practice.			[SK2] Assessment of progress of work		
	[K7_K05] is able to integrate the possessed knowledge from various scientific disciplines, and in the innovative implementation of engineering tasks also take into account system and non-technical aspects, including ethical ones	The student evaluates a manufacturing method and its non-technical aspects in relation to various technical applications. The student analyses various manufacturing methods in terms of their non-technical influences on the environment.			[SK4] Assessment of communication skills, including language correctness		
[K7_U02] demonstrates the ability to write a research paper in Polish and a short scientific report in a foreign language on the basis of own research	The student knows the basic parameters of selected technological processes. The student understands the influence of technical parameters on the functional features of a manufactured item.			[SU3] Assessment of ability to use knowledge gained from the subject			

Subject contents	Lecture Introduction, Systematics of modern manufacturing technologies. Incremental technologies, HSC/HSM machining. Characteristics of HSC/HSM, Dry machining. Precision and ultra-precision machining. Machining centres, structure, principles of creation, equipment, changeable machining centres. Chemical machining, milling, etching. Electrochemical machining, electrochemical grinding, electro-discharge machining, wire EDM. Laser and electron beam machining, surface treatment. Water jet machining, water jet and abrasive blasting, abrasive blasting. Micromachining. Laboratory Exercises Incremental technologies, general knowledge, device programming using Stereolithography as an example, principles of supporting component design, postprocessing data format and model resolution, reverse engineering and object analysis, parameterisation of typical components laser surface treatment plasma treatment and surfacing, advanced plastic working, WEDM.		
Prerequisites and co-requisites	Basic of manufacturing techniques		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final test	60.0%	60.0%
	Laboratory report	60.0%	40.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Katapian S. Manufacturing Engineering and Technology Pearson Education Inc. Upper Saddle River, New Jersey 2006. 2. Oczóś k. E.: Kształtowanie materiałów skoncentrowanymi strumieniami energii. Wyd. Pol. Rzeszowskiej, Rzeszów 1988. 3. Zaborski St.: Obróbka elektrochemiczno-ścierna podstawy i zastosowania, Politechnika Wroclawska 2007, 4. Beer P. Niekonwencjonalne narzędzia do obróbki drewna, nóż ultradźwiękowy, promień świetlny, struga wody, Wydawnictwo Akademii Rolniczej, Poznań 2007, 	
	Supplementary literature	Scientific articles: Journal of Advanced Technology Research, The International Journal of Advanced Technology in Mechanical, Mechatronics and Material, The International Journal of Engineering and Advanced Technology, The International Journal of Advanced Technology & Science Research, Precision Engineering, and others.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		