



## Subject card

Subject name and code	Unconventional production and advanced manufacturing processes, PG_00064721						
Field of study	Management and Production Engineering						
Date of commencement of studies	February 2025		Academic year of realisation of subject		2024/2025		
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		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Zakład Technologii Maszyn i Automatyzacji Produkcji -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Daniel Chuchala				
	Teachers						
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		7.0		23.0	75
Subject objectives	The aim of the course is to familiarise students with unconventional manufacturing processes used in diverse industries						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W04] demonstrates knowledge covering selected issues in the field of advanced detailed knowledge, in particular in the field of methods, techniques, tools and algorithms used in production management and control processes as well as in the design of technological processes		The student has a cross-cutting knowledge of alternative non-conventional manufacturing methods. Can define the need for specific methods to solve a manufacturing problem		[SW1] Assessment of factual knowledge		
	[K7_W11] interprets social, economic, legal (including industrial and intellectual property laws), and other non-technical aspects of engineering activities, and includes them into engineering practice		The student is able to select appropriate manufacturing methods according to economic and environmental assumptions		[SW1] Assessment of factual knowledge		
	[K7_U02] formulates and tests hypotheses related to problems occurring in stationary and non-stationary systems as well as in production and technological processes combined with simple research problems		Students will be able to select a non-conventional manufacturing method as an alternative to traditional methods.		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K7_K11] is aware of importance of professional acting, the need for critical verification of acquired knowledge and consulting experts opinion in case of facing difficulties with individual problem solving		The student verifies the feasibility of a given product using the methods available to him/her		[SK3] Assessment of ability to organize work		

Subject contents	LECTURE:Processes of roundwood processing. Wood flooring manufacturing processes. Densification of wood. Thermal treatment of wood. Processing of glued laminated timber using machining fluids. Milling process using dynamic machining. Ultrasonically assisted metal machining. Milling with high feed rates. Unconventional metal finishing processes - burnishing. Electrical discharge machining processes. Lapping process using 3D printed tools.  LABORATORY: wire EDM machining. EDM machining. Dynamic machining on milling machines. Shaft burnishing process. Machining with MQL system. Face milling with high feed rates. Lapping process using 3D printed tools.		
Prerequisites and co-requisites	Knowledge of basic manufacturing processes based on subtractive, chipless and additive techniques.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	100.0%	30.0%
	Lecture	56.0%	70.0%
Recommended reading	Basic literature	1. Grzesik W.: Advanced machining processes of metallic materials. Theory, modelling and applications. Elsevier, 2017.  2. Markopoulos A.P.: Finite element method in machining processes.Springer, London, 2013.  3. Przybylski W.: Low plasticity burnishing processes. Fundaments, tools and machine tools. Radom: Institute for Sustainable Technologies National Reserch Institute in Radom, 2019	
	Supplementary literature	Pradeep Jayappa, Santhosh Srinivasan, K. Vetrivel Murugan, C. Thangavel, M. Bala Theja, G. Phanindra Raja Varma, S. Marichamy, Ram Subbiah (2022). An overview on role of unconventional machining processes on different materials. Materials Today: Proceedings 50 (5): 1341-1345. <a href="https://doi.org/10.1016/j.matpr.2021.08.253">https://doi.org/10.1016/j.matpr.2021.08.253</a> .	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	E.g. Select a dedicated milling head angle for machining with high feed speeds.		
Work placement	Not applicable		

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