



Subject card

Subject name and code	Manufacturing techniques, PG_00055883						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2023/2024		
Education level	first-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	2	Language of instruction			Polish		
Semester of study	3	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. Daniel Chuchała					
	Teachers	dr hab. inż. Daniel Chuchała mgr inż. Adrian Wolski dr inż. Jacek Haras dr inż. Aleksandra Suchta dr inż. Sławomir Szymański dr hab. inż. Jacek Tomków					
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	6.0		49.0		100
Subject objectives	The aim of subject is learn and understand basic manufacturing techniques, especially with the dominant technique in the world's manufacturing processes, i.e. machining. Understanding the phenomenon of chip formation and the parameters of cutting processes for various types of chip machining. The student will also become learn with the construction and application of cutting tools and the types of materials used to manufacture these tools.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W05] has structured knowledge in the field of electrical engineering and electronics, necessary to understand the basics of operation and selection of electrical machines, electricity transmission systems and power electronic devices	The student is able to determine whether a given main drive unit is sufficient to carry out selected machining processes. The student knows the ways of controlling movements and positions of cutting tools (mechanical and electronic) applied on conventional and numerical machine tools.			[SW1] Assessment of factual knowledge		
	[K6_U02] is able to apply the learned mathematical methods to the analysis and design of elements, systems and energy systems	The student will be able to estimate the energy requirements of a cutting process taking into account different machining methods, cutting tool geometries or different workpiece and tool materials.			[SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	LECTURE: Geometric and kinematic parameters of machining. Movements of the tool and the workpiece. Geometry of the blades in the tool arrangement and work arrangement, geometry of the cutting layer. The phenomenon of chip formation and types of chips. Heat and temperature in the cutting zone. Cooling and lubricating agents. Wear of cutting tools. Strength and cutting power. Vibrations in the cutting process. Tool materials and rules for their selection. The basic methods of machining: cutting, turning, boring, milling, planing, machining of gears e.t.c. Abrasive machining. LABORATORY: Sawing materials and sawing machines. Machining on lathes. Machining on drills. Machining on milling machines. Machining on planers and slotting machines. Machining of gears. Machining on grinders.		
Prerequisites and co-requisites			
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. Cichosz P.: Narzędzia skrawające. WNT, Warszawa 2006. 2. Olszak W.: Obróbka skrawaniem. WNT, Warszawa 2008. 3. Grzesik W. Podstawy skrawania materiałów konstrukcyjnych (Wydanie 3), PWN 2018. 4. Storch B. Podstawy obróbki skrawaniem. Politechnika Koszalińska 2001. 5. Poradnik obróbki skrawaniem (Toczenie - frezowanie - wiercenie - wytaczanie - systemy narzędziowe). Sandvik - Coromant, 2010.	
	Supplementary literature	1. Jemielniak K.: Obróbka skrawaniem. Oficyna Wyd. Politechniki Warszawskiej, Warszawa 1998. 2. Kalpakjian Serope, Schmid Steven. Manufacturing Engineering & Technology (7th Edition), Published by Pearson, 2014.	
	eResources addresses	Adresy na platformie eNauczanie: Techniki wytwarzania, W/L, Energetyka, I stop., 3 sem., zima 2023/24 (PG_00055883) - Moodle ID: 33557 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33557	
Example issues/ example questions/ tasks being completed	The final test contains many questions relating to the topics throughout the subject.		
Work placement	Not applicable		