



## Subject card

Subject name and code	Material Removal Processes, PG_00040044						
Field of study	Mechanical Engineering, Mechanical Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2021/2022		
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	Part-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Manufacturing and Production Engineering -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Kazimierz Orłowski				
	Teachers		dr hab. inż. Daniel Chuchala  dr inż. Bogdan Ścibiorski  dr inż. Sławomir Szymański  dr inż. Wojciech Blacharski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0						
	Adresy na platformie eNauzanie:						
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	30		5.0		40.0	75
Subject objectives	Provision of basic knowledge about manufacturing techniques, with particular emphasis on machining processes as well as machine tools.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[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 knows the basic types of construction materials and their machinability properties, which allows him to correctly select the material of the cutting tools implementing the machining process.		[SW1] Assessment of factual knowledge		
	[K6_W11] possesses knowledge on design, technology and manufacturing of machine parts, metrology, and quality control; knows and understands methods of measuring and calculating basic values describing the operation of mechanical systems, knows basic calculating methods applied to analyse the results of experiments		The student selects the appropriate technologies and tools for implementation of the manufacturing process depending on the type workpiece material.		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U04] is able to perform a critical analysis of the existing technical solutions, present the specification of the technology of manufacturing basic construction elements of machines and engineering assemblies		The student is aware of the effect of various factors externalities on the quality and efficiency of the process manufacturing. He knows the basic threats caused by errors during the manufacturing process.		[SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	LECTURE Geometric and kinematic parameters of cutting. Tool and workpiece movements. The geometry of the cutting blades in the tool and working system, the geometry of the cut layer. The phenomenon of chips formation and types of chips. Heat and temperature in the cutting zone. Cooling and lubricating agents. Wear cutting tools. The quality of the processed surface. Cutting force and power. Vibration in the process machining. Tool materials and rules for their selection. Basic machining methods: turning, milling, drilling, countersinking, reaming. Abrasive processing.LABORATORY: Cutting materials and cutting machines. Machining on lathes. Machining on drills. Machining on milling machines. Machining of gears. Machining on grinders. Machining on planers and slotters		
Prerequisites and co-requisites	There are no requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory exercises	100.0%	30.0%
	Final exam	60.0%	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 Koszalińska2001.5. Poradnik obróbki skrawaniem (Toczenie - frezowanie - wiercenie -wytaczanie - systemy narzędziowe). Sandvik - Coromant, 2010.	
	Supplementary literature	1. Jemielniak K.: Obróbka skrawaniem. Oficyna Wyd. PolitechnikiWarszawskiej, Warszawa 1998.2. Kalpakjian Serope, Schmid Steven. Manufacturing Engineering &Technology (7th Edition), Published by Pearson, 2014.3. Websources	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1) Effect of the built-up-edge on the machining process. 2) Carbide as a tool material. 3) Construction of a lathe universal. 4) Machining technology of hole in fine tolerance H7		
Work placement	Not applicable		