



Subject card

Subject name and code	Machine tools and cutting tools, PG_00054471						
Field of study	Mechanical Engineering, Mechanical Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
Education level	first-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			English		
Semester of study	6	ECTS credits			2.0		
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		prof. dr hab. inż. Kazimierz Orłowski				
	Teachers		prof. dr hab. inż. Kazimierz Orłowski dr hab. inż. Daniel Chuchała				
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						
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		0.0		0.0	30
Subject objectives	Familiarize with the most common varieties of drives of modern numerically controlled machines Understand the most common types of drives of modern numerically controlled machines and their basic components. Extend knowledge of machine tool kinematics using the example of machine tools for hobbing of cylindrical wheels. Familiarize with the basic phenomena in machining processes. Familiarize with basic phenomena in machining processes, construction and principles of selection of modern cutting tools.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W11		Able to find his/her way around the machinery park area.		[SW1] Assessment of factual knowledge		
	K6_U09		The student explains the processes occurring in machining. The student distinguishes and describes basic machining methods hobbing and shaping of toothed wheels		[SU3] Assessment of ability to use knowledge gained from the subject		
	K6_U08		Examines the influence of basic parameters of the cutting process on machining effects. Selects basic tools cutting tools and indexable cutting inserts		[SU3] Assessment of ability to use knowledge gained from the subject		
	K6_W12		Use of computer-aided tools selection and machining parameters.		[SW1] Assessment of factual knowledge		

Subject contents	<p>Structure and principle of operation of multi-axis machining centres. Typical mechanical components of modern drives. Modular drive units. Costs of machining process. Universal tooling used in CNC machining.</p> <p>General characteristics and classification of materials for blades of tools with a defined cutting edge. Causes of wear, geometric indicators of wear, physical and technological indicators of bluntness of the blade. Wear in time. Principles of blade material selection. Cutting forces, methods of their determination. Tool systems (ISO, HSK, CAPTO, etc.). Principles of selection of typical tools and cutting inserts. Kinematics of gear hobbing machine tools.</p> <p>Laboratories:</p> <p>Modular technological machines. Elements of control and drives of technological machines. Kinematic accuracy of hobbing milling machine for gears of cylindrical wheels (Pfauter hobbing machine). Effect of using Wiper geometry on surface roughness. Computer-aided selection of turning, milling or threading tools. Prediction of surface roughness of head milling operations. Selection of tools and machining parameters for drilling of holes on hull drill.</p>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 707 794 734">Subject passing criteria</th> <th data-bbox="799 707 1137 734">Passing threshold</th> <th data-bbox="1142 707 1481 734">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 741 794 768">Lecture</td> <td data-bbox="799 741 1137 768">56.0%</td> <td data-bbox="1142 741 1481 768">90.0%</td> </tr> <tr> <td data-bbox="456 775 794 801">Laboratory</td> <td data-bbox="799 775 1137 801">100.0%</td> <td data-bbox="1142 775 1481 801">10.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Lecture	56.0%	90.0%	Laboratory	100.0%	10.0%
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Lecture	56.0%	90.0%										
Laboratory	100.0%	10.0%										
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Davim (editor): Machining Fundamentals and Recent Advances.. 2008 Springer-Verlag London Limited (DOI 10.1007/978-1-84800-213-5) 2. . GRZESIK Wit. Advanced Machining Processes of Metallic Materials. Theory, Modelling, and Applications. 2nd Edition, ELSEVIER, Amsterdam 2017 3. ASM Handbook, Volume 16, Machining. ASM International. Handbook Committee. 1989 										
	Supplementary literature	<p>Childs, T., Maekawa, K., Obikawa, T., Yamane, Y.. Metal Machining. Theory and Applications. ARNOLD, London 2000</p> <p>Training handbook. Metal cutting technology. C-2920:40 en-GB © AB Sandvik Coromant 2017.11</p>										
	eResources addresses	Adresy na platformie eNauczanie:										
Example issues/ example questions/ tasks being completed	<p>Analysis of the kinematic scheme of a selected hobbing machine tool.</p> <p>Selection of tools using computer programs.</p>											
Work placement	Not applicable											