



Subject card

Subject name and code	Machine tools and cutting tools, PG_00054471						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2024	Academic year of realisation of subject				2026/2027	
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 -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Daniel Chuchała					
	Teachers						
Lesson types	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_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] possesses basic knowledge necessary to understand the ex-technical conditions of engineering activity, possesses basic knowledge on management, including quality management and running commercial enterprise, within the range of protection of intellectual property and patent law; knows general principles of creating and developing forms of individual entrepreneurship and basic HSE rules applicable to machine industry		Use of computer-aided tools selection and machining parameters.			[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_W11		Able to find his/her way around the machinery park area.			[SW1] Assessment of factual knowledge	

Subject contents	<p>Course content – lecture 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="453 732 794 763">Subject passing criteria</th> <th data-bbox="799 732 1141 763">Passing threshold</th> <th data-bbox="1145 732 1492 763">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 770 794 801">Lecture</td> <td data-bbox="799 770 1141 801">56.0%</td> <td data-bbox="1145 770 1492 801">90.0%</td> </tr> <tr> <td data-bbox="453 808 794 840">Laboratory</td> <td data-bbox="799 808 1141 840">100.0%</td> <td data-bbox="1145 808 1492 840">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%										
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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											
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>											
Practical activities within the subject	Not applicable											

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