GDAŃSK UNIVERSITY OF TECHNOLOGY

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

<table>
<tr><td>Subject contents</td><td>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.

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.

Laboratories:

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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Lecture</td><td>56.0%</td><td>90.0%</td></tr>
<tr><td>Laboratory</td><td>100.0%</td><td>10.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>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</td></tr>
<tr><td>Supplementary literature</td><td>Childs, T., Maekawa, K., Obikawa, T., Yamane, Y.. Metal Machining. Theory and Applications. ARNOLD, London 2000

Training handbook. Metal cutting technology. C-2920:40 en-GB © AB Sandvik Coromant 2017.11</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Analysis of the kinematic scheme of a selected hobbing machine tool.

Selection of tools using computer programs.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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