GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Modern technological machines and processing, PG_00038866		
Field of study	Mechatronics, Mechatronics		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2022/2023
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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
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	prof. dr hab. inż. Kazimierz Orłowski dr hab. inż. Daniel Chuchała 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

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	15.0	50

Subject objectives

Explanaitions of processes in mechanisms of machine tools, which affect their technical-operational features. The analyses of the structure, performance and maintenance of basic units and groups of machine tools. Joining
knowledge from different domains.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U10	Solves the set tasks in a in a systematic manner.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
K6_U08	The student is able to read and analyse technical documentation describing a manufactured element and ocumentation describing machine tools and cutting tools, to design the manufacturing process. the manufacturing process.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
K6_U11	It is able to select the basic means of production to solve the given task	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
K6_W08	Knows the basic technologies used in the manufacture of parts machines	[SW1] Assessment of factual knowledge
K6_U05	It is able to design a simple kinematic system and its technical solution	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject

<table>
<tr><td>Subject contents</td><td>LECTURE: Technicaloperational features of machine tools: productivity, accuracy, stiffness, safety, ergonomics, durability and reliability. Basic units of modern machine tools. Requirements, properties and structure of bodies, guiding systems and spindle units. Analysis of athe kinematic system of a machine tool: concepts, kinematical couplings, kinematical accuracy. CNC machine tools with series and parallel connections in the system configuration. Drives of automated manufacturing machines. Evolution of application electric, pneumatic and hydraulic drives. Specification of requirements that drives of modern machine tools have to meet with. Classification, basic features and area of application of contemporary drives with electric motors. Definition and structure of a servodrive. Direct drives. Examples of drives of modern manufacturing machines.

PRACTICAL EXERCISES: Kinematical accuracy of machine tools. Positioning accuracy of the table of the CNC miller. Dynamical investigations of machine tools. Design structure of numerical controlled machine tools. Positioning drives with steping motors. Automated drives of manufacturing machines with AC motors. Power balance in manufacturing machines. Constructional structures of numerically controlled manufacturing machines.</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>Midterm colloquium</td><td>50.0%</td><td>60.0%</td></tr>
<tr><td>Practical exercises</td><td>100.0%</td><td>40.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Jemielniak K.: Automatyczna diagnostyka stanu narzędzia i procesu skrawania. Oficyna Wydawnicza Poli. Warsz. 2002.
Kosmol J.: Serwonapędy obrabiarek sterowanych numerycznie. WNT 1998.
Honczarenko J.: Obrabiarki sterowane numerycznie. WNT Warszawa 2008

Orlowski, K., Sandak, J. & Tanaka, C. The critical rotational speed of circular saw: simple measurement method and its practical implementations. J Wood Sci 53, 388393 (2007). https://doi.org/10.1007</td></tr>
<tr><td>Supplementary literature</td><td>Bocheński T.: Materiały pomocnicze do zajęć laboratoryjnych z programowania obrabiarek CNC. Gdańsk 2006, materiały niepublikowane.</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Final Test contains a number of specific questions with topic, i.e. classes. lectures and lab exercises</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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