



Subject card

Subject name and code	, PG_00056112						
Field of study	Mechatronics						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2024/2025		
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		Polish		
Semester of study	5		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Zakład Technologii Maszyn i Automatyzacji Produkcji -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Daniel Chuchała				
	Teachers		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	Familiarisation with the principles of programming machining on CNC machine tools in the basic (most commonly used) machine tool control systems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U05] is able to use properly choosen tools to compare design solutions of elements and mechatronics systems according to given application and economic crtierions (e.g. power demand, speed, costs)		The student is able to evaluate the usability of the machine tool in the production process depending on the parameters of the applied drive units.		[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W11] has a basic knowledge about the life cycle of mechatronic systems and objects		The student is aware of the limitations of measuring devices used to determine position in a working system.		[SW1] Assessment of factual knowledge		
	[K6_W10] has a basic knowledge about development trends in terms of engineering and technical sciences and scientific disciplines: Mechanical Engineering, Automation, Electronics and Electrical Engineering, adequate for Mechatronics curse		Student knows the basic control systems of CNC machine tools, their possibilities and limitations		[SW1] Assessment of factual knowledge		

Subject contents	Lectures: Fundamentals of design and operation of multi-axis CNC machine tools. Basic CNC controllers and their programming languages. Construction of a CNC machining programme. Basic programming in ISO-Code (G-Code). Basic programming in Heidenhain. Parametric programming. Use of logic functions in CNC programming. Use of special cycles for machining holes and pockets. Use of contour programming in the machining of advanced shapes.Laboratory:Linear interpolation. Circular interpolation. Tool radius compensation.Special cycles for machining holes. Special cycles for machining rectangular pockets. Contour programming. Logic functions and parameterisation in CNC programming.Translated with DeepL.com (free version)		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	100.0%	30.0%
	Lecture	56.0%	70.0%
Recommended reading	Basic literature		
	1. Grzesik W., Nleśony P., Kiszka P.: Programowanie obrabiarek CNC.PWN Warszawa, 2020. 2. Honczarenko J.: Obrabiarki sterowane numerycznie. WNT Warszawa 20083. Users Manual HEIDENHAIN Conversational TNC 640, 4, 20124. Lathe Operators Manual. December 2018, English, Original Instructions, Haas Automation Inc.,U.S.A. HaasCNC.com		
	Supplementary literature		
	1. Kaushik Kumar, Chikesh Ranjan, J. Paulo Davim. CNC Programming for Machining. Springer International Publishing, 1stEdition, 2020, p.136. DOI: 10.1007/978-3-030-41279-12.Fundamentals of CNC Machining. A Practical Guide for Beginners. Compliments of Autodesk, Inc. USA, 20143. Graham T. Smith. CNC Machining Technology. Volume 3: Part Programming Techniques.Springer-Verlag London, 1993, p. 137. DOI: 10.1007/978-1-4471-1748-3		
	eResources addresses	Adresy na platformie eNauczanie: Systemy obrabiarek sterowalnych numerycznie, W/L , Mechatronika, I stop., sem. 05, Zima 2024/25 (PG_00056112) - Moodle ID: 40843 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40843	
Example issues/ example questions/ tasks being completed	Final Test contains a number of specific questions with topic, i.e. classes. lectures and lab exercises		
Work placement	Not applicable		

Document generated electronically. Does not require a seal or signature.