



Subject card

Subject name and code	CNC programming, PG_00053659						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2023/2024		
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		dr hab. inż. Daniel Chuchała				
	Teachers		dr hab. inż. Daniel Chuchała				
			dr inż. Dawid Zieliński				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	0.0	45
	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	45		0.0		0.0	45
Subject objectives	Introduction to the basics of programming CNC machine tools						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W12		The student has knowledge of how to prepare a semi-finished product for the machining process on CNC machine tools. He/she has knowledge about the types of subcontracting services available to prepare a semi-finished product of sufficient quality.		[SW1] Assessment of factual knowledge		
	K6_W11		The student has knowledge of the basic programming languages for CNC machine tools. He/she has knowledge about the basics of creating machining programmes.		[SW1] Assessment of factual knowledge		
	K6_U09		The student is able to estimate costs of manufacturing with the use of CNC machine tools.		[SU2] Assessment of ability to analyse information		
	K6_U08		The student is able to design a CNC machining programme including the selection of tools and cutting parameters.		[SU1] Assessment of task fulfilment		

Subject contents	Lecture: Fundamentals of CNC machine tools. Basic CNC controllers and their programming languages. Design of a CNC machining programme. Basic programming in ISO code (G code). Basic programming in Heidenhain. Parametric programming. Use of logical functions in CNC programming. Laboratory: CNC programming on Heidenhain and ISO-God control for turning and milling processes. Project: Execution of a machining programme for a mechanical component.		
Prerequisites and co-requisites	Basic engineering knowledge of machining, machine tool construction and cutting tools		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture	60.0%	30.0%
	Laboratory	60.0%	30.0%
	Project	60.0%	40.0%
Recommended reading	Basic literature	1. Kaushik Kumar, Chikesh Ranjan, J. Paulo Davim. CNC Programming for Machining. Springer International Publishing, 1st Edition, 2020, p.136. DOI: 10.1007/978-3-030-41279-1 2. Fundamentals of CNC Machining. A Practical Guide for Beginners. Compliments of Autodesk, Inc. USA, 2014 3. Users Manual HEIDENHAIN Conversational TNC 640, 4, 2012 4. Lathe Operators Manual. December 2018, English, Original Instructions, Haas Automation Inc., U.S.A. HaasCNC.com	
	Supplementary literature	1. 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: CNC Programming: W/L/P; DaPE; 1st grade, 6th semester, summer 23/24 (M:320405W0) - Moodle ID: 35885 https://enauzanie.pg.edu.pl/moodle/course/view.php?id=35885	
Example issues/ example questions/ tasks being completed	1. Linear interpolation in G-Code. 2. Linear interpolation in Heidenhain.		
Work placement	Not applicable		