



Subject card

Subject name and code	CNC programming, PG_00053659						
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	dr hab. inż. Daniel Chuchała					
	Teachers	dr hab. inż. Daniel Chuchała prof. dr hab. inż. Kazimierz Orłowski					
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						
	CNC Programming: W/L/P; DaPE; 6th semester, 1st grade, Summer 22/23 (M:320405W0) - Moodle ID: 28757 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28757						
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_U08	The student is able to design a CNC machining programme including the selection of tools and cutting parameters.			[SU1] Assessment of task fulfilment		
	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_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_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		

Subject contents	<p>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.</p> <p>Laboratory: CNC programming on Heidenhain and ISO-God control for turning and milling processes.</p> <p>Project: Execution of a machining programme for a mechanical component.</p>														
Prerequisites and co-requisites	Basic engineering knowledge of machining, machine tool construction and cutting tools														
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 674 794 703">Subject passing criteria</th> <th data-bbox="799 674 1137 703">Passing threshold</th> <th data-bbox="1142 674 1469 703">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 710 794 739">Lecture</td> <td data-bbox="799 710 1137 739">60.0%</td> <td data-bbox="1142 710 1469 739">30.0%</td> </tr> <tr> <td data-bbox="456 745 794 775">Laboratory</td> <td data-bbox="799 745 1137 775">60.0%</td> <td data-bbox="1142 745 1469 775">30.0%</td> </tr> <tr> <td data-bbox="456 781 794 810">Project</td> <td data-bbox="799 781 1137 810">60.0%</td> <td data-bbox="1142 781 1469 810">40.0%</td> </tr> </tbody> </table>			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%
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Lecture	60.0%	30.0%													
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Recommended reading	<p>Basic literature</p>	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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														
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Linear interpolation in G-Code. 2. Linear interpolation in Heidenhain. 														
Work placement	Not applicable														