GDAŃSK UNIVERSITY OF TECHNOLOGY

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						
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=8980						

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

<table>
<tr><td>Subject contents</td><td>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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic engineering knowledge of machining, machine tool construction and cutting tools</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>60.0%</td><td>30.0%</td></tr>
<tr><td>Laboratory</td><td>60.0%</td><td>30.0%</td></tr>
<tr><td>Project</td><td>60.0%</td><td>40.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>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</td></tr>
<tr><td>Supplementary literature</td><td>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</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:
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</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Linear interpolation in G-Code.

2. Linear interpolation in Heidenhain.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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