



Subject card

Subject name and code	, PG_00062018						
Field of study	Mechanical and Naval Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group					
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			8.0		
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						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	36.0	0.0	9.0	18.0	0.0	63
	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	63	0.0		0.0	63	
Subject objectives	The aim of the course is to familiarise the student with the basic construction, principle of operation, handling and programming of CNC machine tools.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W08] has a knowledge of the analysis and design of selected technical systems, machines and technical equipment, selection of construction materials, manufacturing and operation, including their life cycle	Can select the basic components to design a machine tool drive			[SW1] Assessment of factual knowledge		
	[K6_U03] is able to identify, formulate and develop the documentation of a simple design or technological task, including the description of the results of this task in Polish or in a foreign language and to present the results using computer software or other aiding tools	The student is able to read the technical - commissioning documentation of a CNC machine tool, in order to prepare and carry out the necessary maintenance tasks on the machine tool			[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W11] has knowledge of analysis, design, technology and manufacturing of selected technical systems, machinery and equipment, metrology and quality control, knows and understands methods of measurement and calculation of basic quantities describing the operation of technical systems, knows basic calculation methods used to analyse experimental results	The student is able to select the machining parameters necessary for programming and implementation of CNC machining			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	[K6_U14] is able to analyse the operation of devices and compare the construction solutions applying usage, safety, environmental, economic and legal criteria	Students will be able to select a machine tool to meet the needs of the planned production of a mechanical component based on the basic design of CNC machine tools.			[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information		

Subject contents	<p>Lecture Fundamentals of construction and operation of selected 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. List of requirements for drives of modern machine tools. Classification, basic features and range of applications of modern drives with electric motors. Definition and structure of a servo drive. Laboratory Conventional technological machines and with CNC control. Experimental determination of technological bases on a CNC milling machine. Tool length measurement on a CNC milling machine. Linear and circular interpolation during the CNC milling process. Project Project of the machining process for a selected mechanical component. Selection of machine tool, tools, parameters and writing CNC code for the designed machining.</p>														
Prerequisites and co-requisites	Basic machining, strength of materials, fundamentals of machine design and materials science are required														
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="448 566 794 607">Subject passing criteria</th> <th data-bbox="794 566 1141 607">Passing threshold</th> <th data-bbox="1141 566 1487 607">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 607 794 638">Project</td> <td data-bbox="794 607 1141 638">56.0%</td> <td data-bbox="1141 607 1487 638">30.0%</td> </tr> <tr> <td data-bbox="448 638 794 669">Laboratory</td> <td data-bbox="794 638 1141 669">100.0%</td> <td data-bbox="1141 638 1487 669">30.0%</td> </tr> <tr> <td data-bbox="448 669 794 707">Lecture</td> <td data-bbox="794 669 1141 707">56.0%</td> <td data-bbox="1141 669 1487 707">40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Project	56.0%	30.0%	Laboratory	100.0%	30.0%	Lecture	56.0%	40.0%
	Subject passing criteria	Passing threshold	Percentage of the final grade												
	Project	56.0%	30.0%												
	Laboratory	100.0%	30.0%												
Lecture	56.0%	40.0%													
Project	56.0%	30.0%													
Laboratory	100.0%	30.0%													
Lecture	56.0%	40.0%													
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Jemielniak K.: Automatyczna diagnostyka stanu narzędzia i procesu skrawania. Oficyna Wydawnicza Poli. Warsz. 2002. 2. Kosmol J.: Serwonapędy obrabiarek sterowanych numerycznie. WNT1998. 3. Honczarenko J.: Obrabiarki sterowane numerycznie. WNT Warszawa 2008 4. Grzesik W., Nlesłony P., Kiszka P.: Programowanie obrabiarek CNC. PWN Warszawa, 2020. 													
	Supplementary literature	<ol style="list-style-type: none"> 1. Users Manual HEIDENHAIN Conversational TNC 640, 4, 2012 2. Lathe Operators Manual. December 2018, English, Original Instructions, Haas Automation Inc., U.S.A. HaasCNC.com 3. 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. 4. Fundamentals of CNC Machining. A Practical Guide for Beginners. Compliments of Autodesk, Inc. USA, 20145. 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:													
Example issues/ example questions/ tasks being completed	Write a part of a program describing the peripheral machining process of the contour shown on the drawing														

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