Subject card

Subject name and code	Numerically controlled machining tools (CNC, PG_00055244
Field of study	Management and Production Engineering

Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
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	5.0
Learning profile	general academic profile	Assessment form	exam

Conducting unit	Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology

Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Piotr Sender	
	Teachers		

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60	4.0	61.0	125

Subject objectives	Introduction to the construction and principles of operation of numerically controlled machine tools. Acquainting with the techniques of programming, selection of the proper machining process, cutting parameters, tools for a given production task. Acquainting with the principles of using technological equipment.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_K01] feels the need for self-realization by learning throughout life, is looking for modern and innovative solutions in their actions, is able to think creatively and act in an entrepreneurial way	Understanding the principles of programming in the CAD / CAM / CNC environment, enabling work in various systems for programming of CNC machine tools. Acquainting with the construction of numerically controlled machine tools.	[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work
	[K6_U09] can use analytical techniques as well as computer simulation and numerical analysis methods in solving specific problems in the field of production engineering, is able to carry out simple engineering tasks related to the production of typical machine parts using widely understood techniques and computer tools, is able to select and apply appropriate methods of project planning and control courses with the use of computer aided means	Ability to simulate the machining of a part performed on a CNC machine tool. Ability to organize and optimize the production cell.	[SU1] Assessment of task fulfilment
	[K6_U10] " using appropriate techniques and methods, measuring tools, is able to plan, prepare and carry out the measurement of geometrical specifications of products and conduct a critical analysis of the results	Ability to select the appropriate technological allowances, machining parameters and appropriate operations in systems for programming CNC machine tools.	[SU1] Assessment of task fulfilment
	[K6_U03] is able to communicate using various techniques in the professional environment and other environments, has language skills enabling free communication in the field of technical sciences related thematically to management and production engineering	The ability to correctly name the operation, technological equipment and verify the correctness of the machining program.	[SU2] Assessment of ability to analyse information
	[K6_W09] knows the general principles of creating and developing forms of individual entrepreneurship and stimulating employee creativity, using knowledge in the field of design, production and operation of machinery and technical devices	Independent execution of the machining program of the indicated part.	[SW3] Assessment of knowledge contained in written work and projects
	[K6_W13] has detailed knowledge of the production and operation of machines and devices, diagnosing their technical conditions and selection of regeneration techniques	The ability to describe the principles of diagnostics of CNC machine tools and the course of the machining process of the workpiece. Umiejętność szkicowania kinematyki pracy obrabiarki.	[SW2] Assessment of knowledge contained in presentation

Subject contents	Construction of numerically controlled machine tools. Basing, instrumentation, diagnosis. Types of CNC machine tools. Programming of numerically controlled machine tools.
Prerequisites and co-requisites	Basic knowledge of trigonometry.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written test	60.0%	50.0%
	Preparation of the machining program	60.0%	50.0%

Recommended reading	Basic literature	Honczarenko "Numerically Controlled Machine Tools", WNT Warsaw; ISBN 978-83-204-3467-5
	Supplementary literature	Programming instructions of numerically controlled machine tool manufacturers.

	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Describe the construction of a CNC machine tool, characterize possible rail connections, the structure of headstocks and a hydrostatic rolling example. Name the difference between a conventional lathe and a "hard turning" lathe, name the advantages of a "hard turning" lathe. Draw examples of turning and milling machining systems. Describe what an interpolator and a circular interpolation are. List the standardized address characters used in CNC machine tool control codes. Write the CNC's machining code for the indciated workpiece.	
Work placement	Not applicable	