



Subject card

Subject name and code	Computer Technology in Machine Production, PG_00039916						
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			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			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Manufacturing and Production Engineering -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Michał Landowski					
	Teachers	dr inż. Michał Landowski dr inż. Tomasz Seramak dr inż. Aleksandra Świerczyńska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	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	6.0		24.0	75	
Subject objectives	Knowledge of computer methods in machine manufacture						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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	Recognizes the technological equipment and instrumentation for robotic welding processes. Improves the practical work in the position of robotic welding equipped with a type of IRB 2400 robot and welding machinery. Developing a program for a welding robot IRB 2400. Uses computer technology to design advanced robotic welding. Learns internet sources of materials information. Recognizes main software for materials selection support and properties evaluation. Realizes information search. Learns basic elements of materials selection support software. Can use software to ask questions to databases.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information
	[K6_W11] possesses knowledge on design, technology and manufacturing of machine parts, metrology, and quality control; knows and understands methods of measuring and calculating basic values describing the operation of mechanical systems, knows basic calculating methods applied to analyse the results of experiments	Has basic knowledge of computer assist CAM manufacturing. Presents news in the field reverse engineering, and data conversion.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K6_W08] possesses basic knowledge including the methodology of designing machine parts, mechanical devices, selection of construction materials, manufacturing and operation, with the lifetime cycle	Describes modern methods of making models i prototypes of various materials. Distinguishes between different formats of writing models CAD. Has knowledge of design in systems computer assist CAX and exchange data between systems (STEP).	[SW1] Assessment of factual knowledge
Subject contents	LECTURE CAX techniques, Standards for the exchange of model data of an engineering product and numerical control, Search in relational engineering databases, Principles of method and techniques of rapid prototyping process and manufacturing. Data formats used in rapid prototyping techniques, data conversion and errors of conversion. Programming - Rapid IRB 2400 robot, linear motion welding head and welding parameters. Programming of welding parameters for fillet welds and forced positions. Hardfacing of planes - the programming of non-linear movement of welding head for welding MAG. LABORATORY EXERCISE Presentation of rapid prototyping method. Model producing by additive method, technological process preparation. The draft program of welding construction. Testing program of robotic welding position.		
Prerequisites and co-requisites	Knowledge of the basic issues of technology machinery, automatics and computer science.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	51.0%	70.0%
	Practical exercise	51.0%	30.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> Grzesik W.: Programowanie obrabiarek NC/CNC. WNT, Warszawa, 2006. Chlebus E.: Techniki komputerowe CAX. WNT, Warszawa, 2000. Kosmol J., i in.: Automatyzacja obrabiarek i obróbki skrawaniem. WNT, Warszawa, 1999. Dobaj E.: Maszyny i urządzenia spawalnicze. WNT. Warszawa. 1994. Honczarenko, J.: Roboty przemysłowe: Budowa i zastosowanie, WNT. Warszawa, 2004 Notatki wykładowe materiały niepublikowane - dostępne w formie elektronicznej na stronie wykładowcy/eKursu. 	
	Supplementary literature	<ol style="list-style-type: none"> RAPID Reference Manual, instrukcja robota IRB2400, ABB Robotics Products AB, Products AB Kochan P.: Edgcam. Wieloosiowe toczenie CNC. Helion 2017, Jarosław Panasiuk, Wojciech Kaczmarek: Robotyzacja procesów produkcyjnych, Warszawa, WNT, 2017 Kochan P.: Edgcam. Wieloosiowe frezowanie CNC. Helion 2014, Niesłony P., Bartoszek M.: Programowanie obrabiarek NC/CNC. WNT, 	
	eResources addresses	Adresy na platformie eNauczanie: Metody komputerowe w wytwarzaniu maszyn, W/L, MiBM, sem 5, zima 22-23(PG_00039916) - Moodle ID: 27246 https://enauzanie.pg.edu.pl/moodle/course/view.php?id=27246	

Example issues/ example questions/ tasks being completed	Robot work with a positioner, calibration, Design and programming of oscillatory motion, Review of robots programming language instructions, Robot simulation programs, Programming language - RAPID, Programming language - Karel, CAX techniques, standards for the exchange of model data of an engineering product and numerical control, Computer Aided Manufacturing (CAM) in manufacturing systems, Structured query language (SQL) for finding engineering data. Basic settings and system configuration for FDM printing
Work placement	Not applicable