



## Subject card

Subject name and code	Designing of the technological processes CAM, PG_00040073						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject				2023/2024	
Education level	first-cycle studies	Subject group				Optional subject group Subject group related to scientific research in the field of study	
Mode of study	Part-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	Zakład Technologii Maszyn i Automatykacji Produkcji -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Bogdan Ścibiorski				
	Teachers		dr inż. Bogdan Ścibiorski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	22.0	0.0	15.0	0.0	0.0	37
	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	37	10.0		78.0	125	
Subject objectives	The aim of the course is to obtain basic knowledge and skills in the field of designing technological processes with the use of computer-aided manufacturing systems.						
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		The student designs processes technological for typical machine parts in conditions automated production with the use of systems computer assist manufacturing. Develops machine tool control programs CNC for machining of turned parts and milled. The student can troubleshoot the scope cooperation between systems CAD and CAM. The student has knowledge on the selection of CNC systems and machining parameters for selected machine parts.			[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment	
[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		The student identifies techniques used in design and process automation technological. Selects appropriate structures manufacturing of machine parts in automated production			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
Subject contents	Lecture: Current problems of automation and design of technological processes. Learning the principles of designing and automating technological processes of machine parts in CAX systems on the example of typical machine parts. Development of the technological process structure for typical machine parts in computer-aided manufacturing. Programmed workshop of CNC machine tools. Analysis of the selection of a semi-finished product. Modeling in the CAD system of parts, blank and fixtures. Assigning technological features to geometric features. Designing operations and machining cycles. Generating machining programs. Machining simulation and visualization. CAX systems integration. CIM production concept. Product model data exchange in computer manufacturing systems. Laboratory: CAD modeling of parts, blank and fixtures. Development of the indicated operations for a CNC machine tool using the CAM system, including: selection of a machine tool, declaration of a blank and machining holders, selection of tools and machining parameters for individual treatments, generation of tool paths, machining simulation, generating a machining program.						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Reports on practical exercises	90.0%	40.0%
	Exam	56.0%	60.0%
Recommended reading	Basic literature	1. Kochan P.: Edgecam. Wieloosiowe toczenie CNC. Helion 2017, 2. Kochan P.: Edgecam. Wieloosiowe frezowanie CNC. Helion 2014, 3. Grzesik W., Niesłony P., Bartoszek M.: Programowanie obrabiarek NC/CNC, WNT, Warszawa 2010.	
	Supplementary literature	1. Kochan P.: Edgecam.Frezowanie CNC 3-osiowe, Helon 2022, 2. Panasiuk J., Kaczmarek W: Robotyzacja procesów produkcyjnych, Warszawa, WNT 2017, 3. Jemielniak K., Karolczak P., Subbotko R.: Nowoczesne procesy obróbki skrawaniem, Wydawnictwo Naukowe PWN 2022, 4. Feld M.: Projektowanie i automatyzacja procesów technologicznych. Wydawnictwo Naukowe PWN, Warszawa 2018 5. Honczarenko J.: Obrabiarki sterowane numerycznie, Wydawnictwo Naukowe PWN 2017	
	eResources addresses	Uzupełniająco <a href="https://edgecam.pl/bezplatna-wersja-edgecam/">https://edgecam.pl/bezplatna-wersja-edgecam/</a> - Possibility to obtain a free version of EdgeCAM [22/09/2023]	
Example issues/ example questions/ tasks being completed	1. Construction of CNC program. 2. Machining strategies and cycles in computer-aided manufacturing. 3. Parametric programming. 4. Development of technological process using CAD/CAM systems. 5. Methods of determining the zero point on a workpiece.		
Work placement	Not applicable		