GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Computer Aided Design of Technological Processes, PG_00039920					
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	6		ECTS credits		4.0	
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 hab. inż. Mariusz Deja			
	Teachers		dr hab. inż. Mariusz Deja dr inż. Norbert Piotrowski dr inż. Dawid Zieliński dr inż. Bogdan Ścibiorski dr inż. Piotr Sender			

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	45.0	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	7.0	33.0	100

Subject objectives	Student prepares programming of CNC lathes and milling operations with the use of CAM. Selects the system supporting generation, depending on the needs and plant possibilities .		
Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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 selection of the manufacturing process plan depends on the class, type of parts, material, and dimensional and shape requirements.	[SW3] Assessment of knowledge contained in written work and projects
	[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	Ability to use computer programs supporting manufacturing processes, design and selection of technological parameters.	[SU4] Assessment of ability to use methods and tools
Subject contents	Systems for computer-aided manufacturing. Integration of CAD and CAM systems. The exchange of data between systems. Declaration of the workpiece, semi-finished product, tools and fixtures. Definition of machining cycle. Types of turning and milling machining cycles. Selection of machining strategy for specific areas treated. Declaration of cutting parameters. Treatment of free surfaces. High speed machining HSM. Databases in CAM systems. Files containing data access tools. Postprocessors machine tool. Simulation with an analysis of collision. Modification of machining programs. Trends in the development of computer-aided manufacturing.		
Prerequisites and co-requisites	Manufacturing technology, basics of machining, Computer Aided Design CAD		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	active participation in lectures	80.0%	20.0%
	Practical exercises during laboratories	60.0%	40.0%
	Exam	60.0%	40.0%

Recommended reading	Basic literature	
		1. Przemysław Kochan. EdgeCAM. Wieloosiowe frezowanie CNC. Wydawnictwo Helion. Gliwice 2014. 2. Grzesik W., Niesłony P., Bartoszuk M.: Programowanie obrabiarek NC/CNC. WNT, Warszawa 2006. 3. Przybylski W., Deja M.: Komputerowo wspomagane wytwarzanie maszyn. Podstawy i zastosowanie. WNT, Warszawa 2007. 4. Augustyn K.: EdgeCAM. Komputerowe wspomaganie wytwarzania. Wydanie II. Helion, Gliwice 2006.
	Supplementary literature	
		1. Grzesik, W. Advanced machining processes of metallic materials: theory, modelling and applications. Elsevier, 2016. 2. Kosmol J.: Automatyzacja obrabiarek i obróbki skrawaniem. WNT,Warszawa 2000. 3. Chlebus E.: Techniki komputerowe CAx w inżynierii produkcji. WNT, Warszawa 2000.
	eResources addresses	Adresy na platformie eNauczanie: Komputerowo wspomagane projektowanie procesów technologicznych (M:31567W0) - Moodle ID: 30369 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30369

Example issues/ example questions/ tasks being completed	
	1. The range of applications of CAD/CAM manufacturing support systems. 2. Use and integration of CAx techniques. 3. Generating NC programs using the CAD/CAM system. 4. Data exchange - between different systems. 5. Design and technological compliance in computer-aided manufacturing. 6. Object modeling - Feature Modeling. 7. Generating variants of technological solutions. 8. Trends in the development of CAx techniques in the field of computer-aided manufacturing. 9. Integration of CAD / CAM systems with CAE systems. 10. The structure of the standard of working time in terms of computer-aided production. 11. Process planning for turning technology with the use of the CAD/CAM system. 12. Process planning for milling technology with the use of the CAD/CAM system. 13. List the steps to be followed when designing technology using the CAM system (EdgeCam) with the use of 2D models. 14. List the steps to be followed when designing technology using the CAM system (EdgeCam) with the use of 3D models. 15. Designations of the axes of the coordinate system for: turning, milling and designation of additional axes. 16. List the types of models used in CAM systems. 17. List the designs of CNC lathes (positioning of the tool head) and the consequences of tools, spindle revolutions, etc. 18. Characterize the solid models. 19. Characterize the surface models. 20. Present the essential differences between the solid model and the surface model. 21. Characteristics of parametric CAD design. 22. Ways of determining the center of the coordinate system on the workpiece. 23. Ways of determining the blank in CAM systems. 24. Tasks of the technical preparation of production (TPP) department.

Work placement	Not applicable