



Subject card

Subject name and code	Computer-Aided Manufacturing CAD/CAM/CNC, PG_00038326						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Power Electronics and Electrical Machines -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Roland Ryndzionek				
	Teachers		dr hab. inż. Roland Ryndzionek				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30		6.0		14.0	50
Subject objectives	The aim of the course is to provide students with knowledge and practical skills in computer-aided design and manufacturing (CAD/CAM) as well as in the operation of numerically controlled machine tools (CNC). Learn how to integrate design and production processes within a modern engineering environment, including 3D modeling, toolpath generation, machining simulation, and preparation of NC programs. An additional objective is to develop engineering awareness regarding the impact of design and technological decisions on product quality, production efficiency, and the natural environment.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W06] has an extended knowledge of the design of automation components and devices, control and decision support systems control and decision support systems and complex mechatronic systems	Knows the structure and functioning of integrated CAD/CAM/CNC systems and their role in modern production. Is able to prepare a 3D model of a part in a CAD environment and generate machining paths in a CAM environment based on it. Is aware of the impact of their engineering work on product quality and the natural environment, and is able to take these factors into account when performing technological tasks.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K7_K06] is aware of the impact of engineering activities on the quality of applied solutions and the environment	Has knowledge of methods for optimizing manufacturing technology using CAD/CAM/CNC tools, taking into account aspects of quality, precision, and environmental impact. Able to analyze machining technology in terms of quality, cost, and environmental impact, and propose solutions to improve the process. Can work both independently and as part of a team in the preparation and implementation of complex CAD/CAM/CNC tasks, taking a responsible approach to technological decisions.	[SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice
Subject contents	Course content – lecture Overview of computer-aided design and manufacturing (CAD/CAM). Integration of design and production processes, toolpath generation, and basics of finite element analysis (FEA) for structural assessment. Optimization of process parameters and evaluation of design impact on product quality. Course content – laboratory 3D modeling in a CAD environment, process preparation in a CAM system, and performing finite element analysis (FEA) of a selected component. Simulation of the manufacturing process, evaluation of analysis results, and implementation of design improvements.		
Prerequisites and co-requisites	He should have basic knowledge of technical drawing and fundamentals of machine design, as well as basic skills in computer operation and engineering CAD environments (e.g., Inventor, AutoCAD, SolidWorks). Familiarity with the basics of automation and mechatronics, as well as the ability to work effectively in a project team, is recommended.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		60.0%	100.0%
Recommended reading	Basic literature	- Chlebus E.: Techniki komputerowe CAX w inżynierii produkcji. WNT, Warszawa 2000. - Jaskólski A.: Autocad 2010/LT2010+. Kurs projektowania parametrycznego i nieparametrycznego 2D i 3D. Wydawnictwo Naukowe PWN/MIKOM, 2009. - Jaskólski A.: Autodesk Inventor 2009PL/2009+. Metodyka projektowania. Wydawnictwo Naukowe PWN/MIKOM 2009. - Kolka A., Kosmol J., Słupik H.: Programowanie obrabiarek sterowanych numerycznie, Wydawnictwo Politechniki Śląskiej, Gliwice 2001. - Kosmol J.: Serwonapędy obrabiarek sterowanych numerycznie, Wydawnictwo Naukowo-Techniczne, Warszawa 1998. Miecieli M., Wiśniewski W.: Komputerowe wspomaganie projektowania procesów technologicznych. Wydawnictwo Naukowe PWN/MIKOM, 2005.	
	Supplementary literature	- Przybylski W., Deja M.: Komputerowo wspomagane wytwarzanie maszyn. Wydawnictwa Naukowo - Techniczne, Warszawa 2007. - Weiss Z.: Techniki CAX w produkcji, Poznań, Politechnika Poznańska 2002. - Wolski P.: Podstawy obróbki CNC. Wydawnictwo REA, Warszawa 1995.	
	eResources addresses		

Example issues/ example questions/ tasks being completed	1. Development of a 3D model of an electrical machine using Autodesk Inventor. 2. Performing calculations of the main dimensions of the electrical machine using MathCAD. 3. Preparation of a CNC machining program for manufacturing the shaft of the electrical machine.
Practical activities within the subject	Not applicable

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