GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Computer-Aided Manufacturing CAD/CAM/CNC, PG_00038291		
Field of study	Automation, Robotics and Control Systems		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2023/2024
Education level	second-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	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		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Roland Ryndzionek	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	10.0	0.0	10.0	0.0	0.0	20

E-learning hours included: 0.0

Adresy na platformie eNauczanie:

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	20	24.0	6.0	50

Subject objectives

The aim of the course is introduce students with CAD, CAS, CAE, CAM, CNC tools.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K7_W06	Students learn about modern tools supporting the work of an engineer (CAD, CAS, CAE, CAM, CNC). Students learn the practical use of CAD programs. Students learn the principles of programming numerically or computer-controlled machine tools. Students develop their own program to control a simple process.	[SW3] Assessment of knowledge contained in written work and projects
K7_U07	Students learn about modern tools supporting the work of an engineer (CAD, CAS, CAE, CAM, CNC). Students learn the practical use of CAD programs to prepare a virtual prototype device as well as technical documentation and technical drawings.	[SU4] Assessment of ability to use methods and tools
K7_W12	Students learn the practical use of CAD programs to prepare a virtual prototype device as well as technical documentation and technical drawings.	[SW3] Assessment of knowledge contained in written work and projects
K7_K06	Students learn analytical and simulation methods to improve the quality of implemented projects. They learn to reduce production costs without losing quality and thus reduce degradation of the environment.	[SK5] Assessment of ability to solve problems that arise in practice

Subject contents	**LECTURE** CAD Characteristic of computer aided tools (CAD) to design of electrical machines and devices. Using CAS (computer algebra system) software (Mathcad, Mathematica, Macsyma, SMath) to design calculation. Preparing 2D and 3D models. Technical documentation (AutoCAD, Inventor, CATIA). Capabilities of Virtual prototyping in computer aided software (CAE -Computer Aided Engineering) (Flux2D, Maxwell, Opera, Ansys). CAM Characteristic of a software controlled machines, robots, internal transport systems, storage systems, etc. Conections with workshop schedule modules and work place menagement of the MRP II system. Manufacturing automation in CAM systems. CNC Characteristic of systems of numericaly controled machines tools. Structure, principle of operation, control method, programming. **LABORATORY** Elaboration of technical documentation for choisen electrical device or electrical machine: 3D model, engineering drawing, description of technology. Individual tasks.
Prerequisites and co-requisites	Knowledge in range of computer programming.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Practical exercise	60.0%	60.0%
Midterm colloquium	60.0%	40.0%

Recommended reading

Basic literature	1. Chlebus E.: Techniki komputerowe CAx w inżynierii produkcji. WNT, Warszawa 2000. 2. Jaskólski A.: Autocad 2010/LT2010+. Kurs projektowania parametrycznego i nieparametrycznego 2D i 3D. Wydawnictwo Naukowe PWN/MIKOM, 2009. 3. Jaskólski A.: Autodesk Inventor 2009PL/2009+. Metodyka projektowania. Wydawnictwo Naukowe PWN/MIKOM 2009. 4. Kolka A., Kosmol J., Słupik H.: Programowanie obrabiarek sterowanych numerycznie, Wydawnictwo Politechniki Śląskiej, Gliwice 2001. 5. Kosmol J.: Serwonapędy obrabiarek sterowanych numerycznie, Wydawnictwo Naukowo-Techniczne, Warszawa 1998. 6. Miecielica M., Wiśniewski W.: Komputerowe wspomaganie projektowania procesów technologicznych. Wydawnictwo Naukowe PWN/MIKOM, 2005.
Supplementary literature	1. Przybylski W., Deja M. : Komputerowo wspomagane wytwarzanie maszyn. Wydawnictwa Naukowo - Techniczne, Warszawa 2007. 2. Weiss Z.: Techniki CAx w produkcji, Poznań, Politechnika Poznańska2002. 3. 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 the electrical machine in the Autodesk Inventor. 2. Calculations of the main dimensions of the electrical machine in the MathCAD. 3. Development of a program to perform the shaft of the electrical machine on the CNC machine.
Work placement	Not applicable