GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Computer-aided Prototyping, PG_00049614		
Field of study	Electrical Engineering		
Date of commencement of studies	February 2024	Academic year of realisation of subject	2023/2024
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	1	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Controlled Electric Drives -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Jarosław Guziński	
	Teachers	dr inż. Marcin Drzewiecki	
		dr hab. inż. Marek Adamowicz	

Lesson types and methods of instruction	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	5.0	40.0	75

Subject objectives	The aim of object are to improve the knowledge and know-how of rapid and computer aided prototyping problems.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U06	Student can prepare models of simple magnetic elements, simulate and interpret results using the FEMM program	[SU3] Assessment of ability to use knowledge gained from the subject
	K7_W06	Student has knowledge in the field of: programming and CNC service, printed circuit design, design and analysis of magnetic structures using the FEM method, design and implementation 3D construction elements.	[SW1] Assessment of factual knowledge
	K7_U12	Student can design a magnetic element (choke, transformer) using the FEMM software, student can prepare the documentation of a simple DC_DC converter.	[SU1] Assessment of task fulfilment

Subject contents	Examples of the computer-aided designing programs. The rules of the construction prototyping environments. Creating sketches tools and methods of sketching. Methods and instruments of the 3D modelling. Logic operations on regular solids. The principles of designing the technological process in computer-aided programs. Modelling and visualization of the technological processing. Analysis of the designed construction. Making use of the choice of materials to design and analyse constructions. The Lua script language. Design of magnetic components: coils, chokes, transformers. Design of power electronics systems. Methods and devices for 3D printing.

Prerequisites and co-requisites	Basic know-how on design process using CAD software, program languages, and knowledge on power electronics systems.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Class test	60.0%	30.0%
	Laboratory project	60.0%	70.0%

Recommended reading	Basic literature	1. Włodzimierz Przybylski, Mariusz Deja: Komputerowo wspomagane wytwarzanie maszyn Podstawy i zastosowanie, WNT 2007. 2. MTS: Podstawy obróbki CNC, Wyd. REA, Warszawa 1999. 3. Kosmol J.: Serwonapedy obrabiarek sterowanych numerycznie, WNT, Warszawa, 1998. 4. Chlebus E.: Techniki komputerowe CAx w inżynierii produkcji. WNT, Warszawa 2000. 5. Wieczorek H.: Eagle, pierwsze kroki, Wydawnictwo BTC, Warszawa 2007.
	Supplementary literature	1. Kaźmierczak M. i inni: Programowanie obrabiarek sterowanych numerycznie, Wyd. PŚ, Gliwice 2007. 2. Kazimierczuk M.K.: High-frequency magnetic components. John Wiley & Sons, 2009. 3. Konopiński T., Pac R.: Transformatory i dławiki elektronicznych urządzeń zasilających. WNT, Warszawa 1979. 4. Jankowski M.: Elementy grafiki komputerowej, WNT, Warszawa 1990.
	eResources addresses	Adresy na platformie eNauczanie: PROTOTYPOWANIE WSPOMAGANE KOMPUTEROWO [2023/24] - Moodle ID: 35962 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=35962
Example issues/ example questions/ tasks being completed	1. Design of air-core coil. 2. Design of pot-core reactor. 3. Development of simulation of power electronics converter. 4. Design of printed board. 5. Assembling of electronics circuit. 6. Programming of microprocessor system. 7. Axisymmetric and planar models in the FEMM program. 8. Explain the orientation of coordinate systems in the CNC. 9. What types of instructions are used in G-code? Give examples. 10. Write a program in G code for manufacturing an example of a simple element on CNC machine.	
Work placement	Not applicable	