GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Modeling and computer simulation in power electronic systems, PG_00044112		
Field of study	Electrical Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	English
Semester of study	5	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	prof. dr hab. inż. Piotr Chrzan	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	15.0	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	15.0	50

Subject objectives

Get basic knowledge and skill on circuit oriented modelling and simulation of power electronic systems

Learning outcomes

Course outcome	Subject outcome	Method of verification
K_K05		
K6_U10		
K6_U09		
K6_W10		
K6_K01	Student extends skills on team working and presentation of project results.	[SK1] Assessment of group work skills [SK4] Assessment of communication skills, including language correctness
K6_K05	does not include for this course	[SK1] Assessment of group work skills

Subject contents

1) Classification of modeling levels: component, behavioral, functional. Methods of numerical computation of dynamic systems. 2) Simulation methodology of power electronic converters. Survey of general purpose simulation software: LTspice, Matlab-Simulink, Saber-Mast. 3) TCad 8: circuit oriented power electronic simulation software. 4) Specifying parameters of elements in TCad: resistor, capacitor, inductor, transformer, power electronic switches. Models of electrical machines, mechanical loads and controllers. 5) Functional models. 6-7) Control modules in user-defined units.

Prerequisites and co-requisites

Basic knowledge on power electronics and electrical drives.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
project	50.0%	50.0%
lecture	50.0%	50.0%

Recommended reading	Basic literature	1. R. Szczęsny, Komputerowa symulacja układów energo-elektronicznych, Wydawnictwo Politechniki Gdańskiej 1999. 2. M. Wilamowski, J.David Irwin (ed.) The industrial Electronics Handbook: Power electronics and motor drives, CRC Taylor & Francis Group 2nd edition 2011 3. K. Zawirski, J. Deskur, T. Kaczmarek, Automatyka napędu elektrycznego. Wydaw. Politechniki Poznańskiej 2012.
	Supplementary literature	1. J. Nieznański, K. Iwan, R. Sczęsny, M. Ronkowski, TCad for Windows, Softech 1996 2. A.-R. Haithem, A. Iqbal, J. Guziński, High performance control of ac drives with Matlab/Simulink, John Wiley & Sons 2021
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Explain differences between behavioral and functional modeling on the example of pulse width modulation voltage source inverter.	
Work placement	Not applicable	