GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Modelling and Simulation of Electromechatronic Systems, PG_00048273
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	Polish
Semester of study	5	ECTS credits	6.0
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	30.0	0.0	30.0	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	5.0	85.0	150

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	