

## § GDAŃSK UNIVERSITY § OF TECHNOLOGY

## Subject card

Subject name and code	Modeling and Simulation in Electrical Engineering, PG_00017679									
Field of study	Electrical Engineering									
Date of commencement of studies	October 2021		Academic year of realisation of subject			2023/2024				
Education level	first-cycle studies		Subject group							
Mode of study	Part-time studies		Mode of delivery			at the university				
Year of study	3		Language of instruction			Polish				
Semester of study	5		ECTS credits			4.0				
Learning profile	general academic profile		Assessment form			assessment				
Conducting unit	Department of Power Electronics and Electrical Machines -> Faculty of Electrical and Control Engineering							ngineering		
Name and surname	Subject supervisor		dr inż. Krzysztof Iwan							
of lecturer (lecturers)	Teachers	achers dr inż. Krzysztof Iwan								
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM		
	Number of study hours	20.0	10.0	0.0 0.0			0.0	30		
	E-learning hours included: 0.0									
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic ed in study	Participation in consultation hours		Self-study		SUM		
	Number of study hours	30		3.0		67.0		100		
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				
	K6_U05		Student follows the regulations of the computer laboratory			[SU1] Assessment of task fulfilment				
	K6_K05		Student knows about the threats to health and life during use electrical devices			[SK1] Assessment of group work skills [SK3] Assessment of ability to organize work				
	K6_W11		Student is able to use simulation software to define model of control of power converters			[SW3] Assessment of knowledge contained in written work and projects				
	K6_W10		Student has knowledge of the circuit models of the electric drive systems			[SW3] Assessment of knowledge contained in written work and projects				
	K6_W09		Student determines the requirements for models of power system components			[SW3] Assessment of knowledge contained in written work and projects				
	K6_U11		The student has knowledge of the measurement procedures of electric circuits			[SU1] Assessment of task fulfilment				
	K6_U09		Student is able to carry out measurements and computer simulation of the operating states of the electric drive system including damage			[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment				
	K6_K01		Student extends skills on team working and presentation of project results.			[SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice				
Subject contents	1) Classification of modeling levels: component, behavioral, functional. Methods of numerical computation of dynamic systems. 2) Simulation methodology of power electronic converters. 3-4) Survey of general purpose simulation software: PLECS, TCad. 5) Specifying parameters of elements in PLECS and TCad: resistor, capacitor, inductor, transformer, power electronic switches. Models of electrical machines, mechanical loads and controllers. 6) Functional models. 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 Supplementary literature	<ol> <li>Szczęsny R., Komputerowa syt energoelektronicznych, Gdańsł 1999</li> <li>Serafin E.: Modelowanie urząd: 10/2013,</li> <li>Głąb M., Judek S., Skibicki J., ł układów przekształtnikowych p programów symulacyjnych ana Naukowe WEiA PG Nr 21, 200:</li> <li>Pierz P.: Symulacyjne metody a automatyki elektroenergetyczne</li> <li>J. Nieznański, K. Iwan, R. Szczęs Windows, Softech 1996</li> </ol>	mulacja układów < : Wydaw. Politechniki Gdańskiej, zeń w elektroenergetyce. TTS Komputerowe modelowanie rzy wykorzystaniu różnych liza porównawcza, Zeszyty 5 analizy funkcjonowania układów ej. elektro.info 11/2018   2018-12-12 sny, M. Ronkowski, TCad for			
	eResources addresses	Adresy na platformie eNauczanie: MODELOWANIE I SYMULACJA W ELEKTROTECHNICE [Niestacjonarne][2023/24] - Moodle ID: 32242 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32242				
Example issues/ example questions/ tasks being completed	Develop a PLECS model of a single-phase 12V/230V 100W inverter and, based on simulation, determine the requirements for the inverter transistors.					
Work placement	Not applicable					