



Subject card

Subject name and code	Process Modelling in Electrical Power Engineering, PG_00045973						
Field of study	Electrical Engineering						
Date of commencement of studies	February 2023		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	2		ECTS credits		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Jacek Klucznik				
	Teachers		dr hab. inż. Jacek Klucznik				
			dr hab. inż. Robert Kowalak				
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		6.0		39.0	75
Subject objectives	Teaching of modeling and simulations of processes in power systems, using modern computer tools.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_W03		The student distinguishes between steady state and transient models. The student recognises the differences in the ways of describing a dynamic model. The student demonstrates methods of modelling power grids, synchronous generators, excitation systems and turbines.		[SW1] Assessment of factual knowledge		
	K7_U06		The student builds models of selected power system components using the PowerFactory environment.		[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
	K7_K03		The student determines the initial conditions for dynamic models and assesses their correctness.		[SK1] Assessment of group work skills [SK2] Assessment of progress of work		
Subject contents	Modelling of Power system steady and dynamic states. Single machine and multi machine models. Power system components modelling: synchronous generators, asynchronous machines, overhead and cable lines, two and three windings transformers, loads. Modelling of thermal and hydro power plants devices and controllers: prime movers, speed and power governors, excitation systems, voltage controller, power system stabiliser. Modelling of wind generators and wind farms. Reduced models of wind farms.						
Prerequisites and co-requisites	Electric power engineering basics. Power systems.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Model building		50.0%		70.0%		
	Final test		50.0%		30.0%		

Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Zajczyk R.: Modele matematyczne systemu elektroenergetycznego do badania elektromechanicznych stanów nieustalonych i procesów regulacyjnych, Wydawnictwo Politechniki Gdańskiej, 2003 2. Machowski J., Regulacja i stabilność systemu elektroenergetycznego, Oficyna Wydawnicza Politechniki Gdańskiej, Warszawa, 2007
	Supplementary literature	<ol style="list-style-type: none"> 1. Kacejko P., Machowski J.: Zwarcia w sieciach elektroenergetycznych, WNT, Warszawa 2002. 2. Lubośny Z.: Farmy wiatrowe w systemie elektroenergetycznym, WNT, Warszawa 2009
	eResources addresses	Adresy na platformie eNauczanie: MODELOWANIE PROCESÓW W ELEKTROENERGETYCE [2023/24] - Moodle ID: 28394 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28394
Example issues/ example questions/ tasks being completed	Single generator model building with turbine model and voltage controller.	
Work placement	Not applicable	