



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 2026		Academic year of realisation of subject		2026/2027		
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 -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Jacek Klucznik				
	Teachers		dr hab. inż. Jacek Klucznik				
Lesson types	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_K03] can interact and work in a group assuming various roles and identify priorities for the achievement of a specific task		He is able to work effectively in a project team, taking on various roles (e.g., leader, analyst, contractor) in the process of modeling electrical phenomena.		[SK3] Assessment of ability to organize work		
	[K7_W03] has an extended and deepened knowledge of the field related to electrical power systems and electrical equipment		Has in-depth knowledge of the principles of operation, mathematical models, and characteristics of electrical power systems and devices. Is familiar with modern modeling and simulation methods used to analyze the operation of electrical power systems and devices.		[SW1] Assessment of factual knowledge		
	[K7_U06] is able to analyse, model, simulate and design electrical systems		Can analyze processes and phenomena occurring in electrical power systems using mathematical and IT tools.		[SU1] Assessment of task fulfilment		
Subject contents	Course content – lecture Lecture: 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.						
	Laboratory: Development of a model of a power system for studying static and dynamic states. Verification of model performance. Conducting power flow studies and analyses of selected fault states affecting the system's operation based on the developed model.						
Prerequisites and co-requisites	Electric power engineering basics. Power systems.						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final test	50.0%	30.0%
	Model building and analysis	50.0%	70.0%
Recommended reading	Basic literature	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	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		
Example issues/ example questions/ tasks being completed	Construction and analysis of a power grid with several synchronous generators equipped with a turbine model and voltage regulator		
Practical activities within the subject	Not applicable		

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