



Subject card

Subject name and code	Process Modelling in Electrical Power Engineering, PG_00063598						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group		Specialty subject group Subject group related to scientific research in the field of study		
Mode of study	Part-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		2.0		
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 dr hab. inż. Robert Kowalak				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	10.0	0.0	0.0	20
	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	20		5.0		25.0	50
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_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		
	[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		
Subject contents	Course content – 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.						
	Course content – laboratory						
	Development of a power system model for the analysis of static and dynamic conditions. Verification of the model's performance. Conducting power flow studies and analyses of selected fault conditions affecting the operation of the system, based on the developed model.						

Prerequisites and co-requisites	Fundamentals of electrical power engineering, electrical power systems.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final test	50.0%	30.0%
	Model development and analysis	50.0%	70.0%
Recommended reading	Basic literature	Kundur P.: Power System Stability and Control. McGraw-Hill, Inc.1994.	
	Supplementary literature		
	eResources addresses		
Example issues/ example questions/ tasks being completed	Development and analysis of the operation of a power system with several synchronous generators, each equipped with a models of a turbine and a voltage regulator.		
Practical activites within the subject	Not applicable		

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