GDAŃSK UNIVERSITY OF TECHNOLOGY

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	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	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	