



Subject card

Subject name and code	Modelling and Simulation of Control Systems Applied in Energy Technologies (WOiO), PG_00042105						
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2023/2024		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	4		Language of instruction		English		
Semester of study	7		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Zakład Energetyki i Automatyki Morskiej -> Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Mohammad Ghaemi				
	Teachers						
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		5.0		65.0	100
Subject objectives	The aim of the course is to learn the principles of modeling and simulation of control systems used in power systems						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U01		The student is able to obtain information from the literature and other sources, organize, interpret them, and formulate conclusions in order to make simulation models of power control systems.		[SU2] Assessment of ability to analyse information		
	K6_W06		The student knows the classical and development techniques in the field of power control systems, the principles of selection, modelling and simulation of devices and elements of such systems, as well as the principles of their functioning, particularly in the context of the use of renewable energy sources.		[SW1] Assessment of factual knowledge		
	K6_U05		The student is able to formulate and solve a simple task concerning the design of power control systems using software and simulation tools and evaluate the cost-effectiveness of the solution.		[SU4] Assessment of ability to use methods and tools		

Subject contents	1. Principles of making a simulation model of the power control system (lecture) 2. Stages of preparing a simulation model of the power control system (lecture) 3. Implementation of the simulation model (lab.) 4. Simulation model of wind power plant control systems (lecture + lab.)* 5. Simulation model of the hydropower plant control system (lecture + lab.)* 6. Simulation model of the internal combustion engine control system (lecture + lab.)* 7. Simulation model of the gas turbine control system (lecture + lab.)* 8. Simulation model of the steam turbine control system (lecture + lab.)* 9. Simulation model of electrical generator control system (lecture + lab.)* *) the mathematical model will be presented during the lecture, and the simulation study will be carried out in the lab.		
Prerequisites and co-requisites	Fundamental of Control Systems Power Systems		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Reports (for the lab. part)	56.0%	50.0%
	Test (for the lecture part)	56.0%	50.0%
Recommended reading	Basic literature	Joe H. Chow Rensselaer (2020), Power System Modeling, Computation, and Control. John Wiley & Sons Ltd., NY, USA. ISBN 9781119546870 9available online: https://onlinelibrary.wiley.com/doi/chapter-epub/10.1002/9781119546924.fmatter)	
	Supplementary literature	Egeland O., Tommy J. (2003). Modeling and Simulation for Automatic Control. Marine Cybernetics, Trondheim, Norway.ISBN 82-92356-01-0	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		