GDAŃSK UNIVERSITY OF TECHNOLOGY

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