



Subject card

Subject name and code	Application of power electronic systems in power system , PG_00057621						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2024/2025		
Education level	second-cycle studies	Subject group					
Mode of study	Part-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 Power Electronics and Electrical Machines -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Robert Małkowski					
	Teachers						
Lesson types and methods of instruction	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	10.0		45.0	75	
Subject objectives	Describing FACTS systems as control objects in the power system.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W06] has in-depth knowledge of industrial electronics, microprocessor control systems, programmable logic systems and printed circuit design and prototyping computer-aided prototyping	Can select and parameterize the appropriate power electronic device to limit the level of modeled interference.			[SW3] Assessment of knowledge contained in written work and projects		
	[K7_U03] is able to obtain information from literature, databases and other sources, also in English, draw conclusions, formulate and fully justify opinions. substantiate opinions; is able to identify directions for further learning and implement the process of self-education	Ability to prepare a synthetic study based on literature sources, including in English.			[SU2] Assessment of ability to analyse information		
	[K7_W02] has an in-depth and structured knowledge of electrical measurements electrical measurements, the methods and equipment used for electrical measurements of non-electrical quantities, he/she knows the principles of testing operation tests of electrical equipment, has a structured knowledge of electricity quality issues	does not apply to the content of classes			[SW1] Assessment of factual knowledge		
[K7_U02] is able to prepare and deliver a short oral presentation on a selected technical topic	does not apply to the content of classes			[SU1] Assessment of task fulfilment			

Subject contents	<p>LECTURE: Selected problems in the control of the power system operation. The range of power electronics application in the power system. Power electronic switches and their properties. selected of FACTS (Flexible AC Transmission Systems) used in power systems. Influence of FACTS systems on the power system - voltage and P, Q power flow regulation. Construction and principle of operation - shunt systems, series systems and series-shunt systems. Structures and principle of operation. Impact on power systems. Range of application.</p> <p>LABORATORY: Modeling the work of selected FACTS systems. Testing the operation of FACTS systems with the use of physical models (UPFC, STATCOM, SVC).</p>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Subject passing criteria</th> <th style="width: 25%;">Passing threshold</th> <th style="width: 25%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>50.0%</td> <td>60.0%</td> </tr> <tr> <td>Laboratories</td> <td>50.0%</td> <td>40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Lectures	50.0%	60.0%	Laboratories	50.0%	40.0%
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Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Types of modern power electronic systems supporting the operation of the power system and their classification. 2. List and describe the types of shunt power compensators 3. UPFC circuits - application, method of connection to the system, advantages and disadvantages. 4. Hybrid FACTS systems - characteristics, application. 											
Work placement	Not applicable											

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