



Subject card

Subject name and code	Quality of Electric Energy, PG_00038377						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2025	Academic year of realisation of subject				2025/2026	
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	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 - > Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Jarosław Łuszcz				
	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		5.0		50.0	75
Subject objectives	The aim of the course is to provide knowledge on determining the state of power quality in the supply network, the causes of its degradation and methods of improvement.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_K02] is aware of the impact of engineering activities on the environment, understands the the non-technical effects of those activities	assesses the impact of poor energy quality on the electromagnetic environment.			[SK5] Assessment of ability to solve problems that arise in practice		
	[K7_U05] is able to select equipment and carry out electrical measurements, design measuring systems for the determination of nonelectrical quantities, and analyse the results obtained	performs power quality measurements and evaluates measurement results			[SU1] Assessment of task fulfilment		
	[K7_U08] be able to carry out tests on electrical power equipment, analyse disturbances in electrical power systems, record and assess the quality of electricity in the power network	assess power quality			[SU1] Assessment of task fulfilment		
	[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	applies systematized knowledge in the field of electrical energy quality issues			[SW1] Assessment of factual knowledge		

Subject contents	<p>LECTURE Methods of determining power quality parameters. Analysis of exemplary results of long-term recording of power quality. Sources of harmonic and inter-harmonic distortions in the power system. The impact of power electronic converter systems on the quality of power. Methods of improving power quality - passive and active filtration.</p> <p>LABORATORY Real-time measurements of power quality parameters. Analysis of recorded power quality parameters. Study of harmonic distortions generated by lighting devices. Study of harmonic distortions generated by AC/DC power supplies. Passive and active filtration of harmonic distortions. Study of harmonic distortions generated by adjustable speed drives.</p>														
Prerequisites and co-requisites															
Assessment methods and criteria	<table border="1" data-bbox="448 562 1487 696"> <thead> <tr> <th data-bbox="448 562 794 595">Subject passing criteria</th> <th data-bbox="794 562 1141 595">Passing threshold</th> <th data-bbox="1141 562 1487 595">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 595 794 629">Semester/diploma dissertation</td> <td data-bbox="794 595 1141 629">50.0%</td> <td data-bbox="1141 595 1487 629">50.0%</td> </tr> <tr> <td data-bbox="448 629 794 663">Analysis and test report</td> <td data-bbox="794 629 1141 663">50.0%</td> <td data-bbox="1141 629 1487 663">25.0%</td> </tr> <tr> <td data-bbox="448 663 794 696">Midterm colloquium</td> <td data-bbox="794 663 1141 696">50.0%</td> <td data-bbox="1141 663 1487 696">25.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Semester/diploma dissertation	50.0%	50.0%	Analysis and test report	50.0%	25.0%	Midterm colloquium	50.0%	25.0%
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Sterowanie jakością energii elektrycznej w elektroenergetycznych sieciach rozdzielczych z wykorzystaniem półprzewodnikowych kompensatorów równoległych. Łódź: Wydawnictwo Politechniki Łódzkiej, 2006. 8. Zbigniew Hanzelka i Andrzej Firlit Ed, <i>Elektrownie ze źródłami odnawialnymi: zagadnienia wybrane</i>. Kraków: Redakcja Wydawnictw AGH, 2015. 9. Smolarczyk, Adam i in. <i>Harmoniczne w systemach elektroenergetycznych</i>. Wydanie I. Warszawa: Oficyna Wydawnicza Politechniki Warszawskiej, 2023. 10. Strzelecki, Ryszard, and Grzegorz Benysek Ed., Power Electronics in Smart Electrical Energy Networks. London: Springer, 2008. 11. Benysek, Grzegorz, and Marian Pasko Ed., <i>Power Theories for Improved Power Quality</i>. New York: Springer, 2012. 12. Bak-Jensen, Birgitte, and Birgitte Bak-Jensen. <i>Distribution Power Systems and Power Quality</i>. 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eResources addresses	Adresy na platformie eNauczenie:														
Example issues/ example questions/ tasks being completed	Analysis of long term record of power quality indices														
Work placement	Not applicable														

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