



Subject card

Subject name and code	Quality of Electric Energy , PG_00016901						
Field of study	Electrical Engineering						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2026/2027		
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 Power Electronics and Electrical Machines -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Jarosław Łuszcz				
	Teachers		dr hab. inż. Jarosław Łuszcz				
Lesson types	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		4.0		41.0	75
Subject objectives	Providing knowledge on determining the energy quality in the supply network, the causes of its degradation and methods of improvement.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[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_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 low power quality on the electromagnetic environment.		[SK5] Assessment of ability to solve problems that arise in practice		
	[K7_U08] e 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		Assesses 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 systematic knowledge in the field of electricity quality issues		[SW1] Assessment of factual knowledge		

Subject contents	Course content – lecture LECTURE Methods for determining power quality parameters. Analysis of sample results from long-term power quality recording. Sources of harmonic and interharmonic distortions in power systems. The impact of converter systems on power quality. Power quality improvement methods - passive and active filtration. 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 converter drive systems.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Semester/diploma dissertation	50.0%	50.0%
	Midterm colloquium	50.0%	25.0%
	Analysis and test report	50.0%	25.0%
Recommended reading	Basic literature	1. Kowalski Z.: Jakość energii elektrycznej. Wyd. Politechniki Łódzkiej 2007. 2. Strzelecki R., Benysek G.: Power Electronics in Smart Electrical Energy Networks. Springer 2008. 3. Strzelecki R., Supronowicz H.: Współczynnik mocy w systemach zasilania prądu przemiennego i metody jego poprawy. Wyd. Politechniki Warszawskiej 2007. 4. A. Kempski: Elektromagnetyczne zaburzenia przewodzone w układach napędów przekształtnikowych. Oficyna Wydawnicza Uniwersytetu Zielonogórskiego 2005. 5. R. Smoleński: Conducted Electromagnetic Interference (EMI) in Smart Grids. Springer 2012. 6. Gregorio Romero Rey and Luisa Martinez Muneta (Ed.) Power Quality Harmonics Analysis and Real Measurements Data , Croatia : InTech, 2011. 7. Ahmed Zobaa, Mario Manana Canteli and Ramesh Bansal: Power Quality Monitoring, Analysis and Enhancement. InTech 2011.	
	Supplementary literature	1. Baggini A.: Handbook of Power Quality. John Wiley & Sons 2008. 2. Benysek G.: Improvement in the Quality of Delivery of Electrical Energy using Power Electronics Systems. Springer 2007. 3. Hanzelka Z., Bień A.: Power quality application guide : harmonics, interharmonics. European Copper Institute, Brussels 2004.	
	eResources addresses		
	Example issues/ example questions/ tasks being completed	Analysis of long term record of power quality indices	
Practical activities within the subject	Not applicable		

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