GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Quality of Electric Energy (PQ II), PG_00057618
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	
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	2.0
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

Lesson types

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	25.0	50

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_W06] has in-depth knowledge of industrial electronics, microprocessor control systems, programmable logic systems and printed circuit design and prototyping computer-aided prototyping	applies systematized knowledge in the field of electrical energy quality issues	[SW1] Assessment of factual knowledge
[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	applies systematized knowledge in the field of electrical energy quality issues	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_U02] is able to prepare and deliver a short oral presentation on a selected technical topic	presents the results of engineering research.	[SU5] Assessment of ability to present the results of task
[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	Course content – lecture LECTURE Methods of determining power quality parameters. Analysis of the 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. LABORATORY Real-time measurements of power quality parameters. Analysis of recorded power quality parameters. Study of harmonic distortions generated by AC/DC power supplies. Study of harmonic distortions generated by lighting devices. Study of harmonic distortions generated by adjustable speed drives.
Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	reports	50.0%	50.0%
	test	50.0%	50.0%

Recommended reading	Basic literature	Hanzelka, Zbigniew, Jakość dostawy energii elektrycznej: zaburzenia wartości skutecznej napięcia. Komitet Elektrotechniki Polskiej Akademii Nauk. Kraków: Wydawnictwa AGH, 2013. Kowalski, Zbigniew, Jakość energii elektrycznej / Zbigniew Kowalski. Łódź: Wydawnictwo Politechniki Łódzkiej, 2007. Hanzelka, Zbigniew i in. Instalacje fotowoltaiczne w systemie elektroenergetycznym: jakość dostaw energii elektrycznej, warunki techniczne przyłączenia instalacji PV. Warszawa: PWN, 2024. Wasiak, Irena. Sterowanie jakością energii elektrycznej w elektroenergetycznych sieciach rozdzielczych z wykorzystaniem półprzewodnikowych kompensatorów równoległych. Łódź: Wydawnictwo Politechniki Łódzkiej, 2006. Zbigniew Hanzelka i Andrzej Firlit Ed, Elektrownie ze źródłami odnawialnymi: zagadnienia wybrane. Kraków: Redakcja Wydawnictw AGH, 2015.
	Supplementary literature	Strzelecki, Ryszard, and Grzegorz Benysek Ed., Power Electronics in Smart Electrical Energy Networks. London: Springer, 2008. Benysek, Grzegorz, and Marian Pasko Ed., Power Theories for Improved Power Quality. New York: Springer, 2012. Łuszcz, Jarosław, Ed., Power Quality Issues in Distributed Generation. InTech, Oct. 21, 2015. doi: 10.5772/59895. G. Romero, Ed., Power Quality Harmonics Analysis and Real Measurements Data. InTech, Nov. 23, 2011. doi: 10.5772/699. Łuszcz, Jarosław, Voltage Harmonics Measuring Issues in Medium Voltage Systems. Power Quality Harmonics Analysis and Real Measurements Data, InTech, 23 Nov. 2011. Crossref, doi: 10.5772/16411. A. Zobaa, Ed., Power Quality Issues. InTech, Apr. 17, 2013. doi: 10.5772/3373. Łuszcz, Jarosław, High Frequency Harmonics Emission in Smart Grids. Power Quality Issues, InTech, 17 Apr. 2013. Crossref, doi: 10.5772/52874. Bak-Jensen, Birgitte, and Birgitte Bak-Jensen. Distribution Power Systems and Power Quality. Basel, Switzerland: MDPI 2020.

	eResources addresses	
Example issues/ example questions/ tasks being completed		
Practical activites within the subject	Not applicable	

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