



## Subject card

Subject name and code	Electromagnetic Compatibility of Electrical Equipment (EMC), PG_00041815						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2021	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	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			4.0		
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. Jarosław Łuszcz				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60		5.0		35.0	100
Subject objectives	Identification of problems related to electromagnetic interference in electrical devices.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_U09	The student is able to select power equipment for various load modes.			[SU3] Assessment of ability to use knowledge gained from the subject		
	K6_W10	The student knows the principles of processing, use and rational use of electrical energy			[SW1] Assessment of factual knowledge		
	K6_K01	The student knows the sources of specialist knowledge extending the scope of program content.			[SK5] Assessment of ability to solve problems that arise in practice		
	K6_K05	He can organize work in accordance with the principles of safety rules.			[SK3] Assessment of ability to organize work		

## Subject contents

Sources and propagation paths of conducted and radiated disturbances. Emissivity and electromagnetic immunity of electrical devices. Electromagnetic compatibility of power electronic devices. EMC and LVD directive, harmonized standards, certification tests of electrical devices. Methods of reducing electromagnetic interference (grounding, shielding, filtration, separation, symmetrization). Basic anti-interference elements (capacitors, chokes, RFI filters, screens). Principles of designing electromagnetically compatible devices and installations. Sample analyzes of typical problems related to EMC of electrical devices. Problems related to EMC in converter drive systems. The impact of electrical devices on the environment, living organisms and humans.

Rodzaje tłumaczeń Tłumaczenie tekstu Tekst źródłowy Źródła i propagacja zaburzeń przewodzonych i promieniowanych. Emisyjność i odporność elektromagnetyczna urządzeń elektrycznych. Specyfika kompatybilności elektromagnetycznej urządzeń energoelektronicznych. Dyrektywa EMC i LVD, normy zharmonizowane, badania certyfikacyjne urządzeń elektrycznych. Metody ograniczania zakłóceń elektromagnetycznych (uziemiające, ekranowanie, filtracja, separacja, symetryzacja). 843 / 5000 Wyniki tłumaczenia Sources and propagation of conducted and radiated disturbances. Emissivity and electromagnetic immunity of electrical devices. The specificity of electromagnetic compatibility of power electronic devices. EMC and LVD directive, harmonized standards, certification tests of electrical devices. Methods of reducing electromagnetic interference (grounding, shielding, filtration, separation, symmetrization). Methods of reducing electromagnetic interference (grounding, shielding, filtration, separation, symmetrization). Metody redukcji zakłóceń elektromagnetycznych (uziemiające, ekranowanie, filtracja, separacja, symetryzacja). Basic anti-interference elements (capacitors, chokes, RFI filters, screens). Principles of designing electromagnetically compatible devices and installations. Sample analyzes of typical problems related to EMC of electrical devices. Problems related to EMC in converter drive systems. The impact of electrical devices on the environment, living organisms and humans. Więcej o: of of v Definicje of przyimek 1 expressing the relationship between a part and a whole. the sleeve of his coat przedrostek 1 variant spelling of ob- assimilated before f (as in offend ). skrót 1 Old French. of przykłady format\_ quote two weeks of training Tłumaczenia of Część mowy Tłumaczenie Tłumaczenia odwrotne Częstotliwość help\_outline przyimek z

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Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Task realisation	60.0%	100.0%
Recommended reading	Basic literature	<p>Charoy A.: Zakłócenia w urządzeniach elektronicznych: zasady i porady instalacyjne. Tomy: 1 - 4, WNT 1999, 2000.</p> <p>Konczakowska A., Spiralski L., Hasse L., Kołodziejski J.: Zakłócenia w aparaturze elektronicznej. Radioelektronik Sp. z o.o., Warszawa 1995.</p> <p>Więckowski T.W.: Badania kompatybilności elektromagnetycznej urządzeń elektrycznych i elektronicznych. Wrocław 2001.</p> <p>A. Kempki: Elektromagnetyczne zaburzenia przewodzone w układach napędów przekształtnikowych. Oficyna Wydawnicza Uniwersytetu Zielonogórskiego 2005.</p>	
	Supplementary literature	<p>R. Smoleński: Conducted Electromagnetic Interference (EMI) in Smart Grids. Springer 2012.</p> <p>J. Łuszcz: High Frequency Conducted Emission in AC Motor Drives Fed By Frequency Converters: Sources and Propagation Path. Wiley 2018.</p>	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Assessment of electromagnetic compatibility of an electrical device.		
Work placement	Not applicable		