



Subject card

Subject name and code	Electromagnetic Compatibility, PG_00042165						
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject		2022/2023			
Education level	first-cycle studies	Subject group		Optional subject group Subject group related to scientific research in the field of study			
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		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						
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	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		3.0		17.0	50
Subject objectives	Discussion of problems related to electromagnetic interference in electrical devices.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U04		Ability to take into account compatibility requirements electromagnetic at designing the installation electric.		[SU3] Assessment of ability to use knowledge gained from the subject		
	K6_U03		Student can assess EMC hazards in electrical installations.		[SU2] Assessment of ability to analyse information		
	K6_W06		Knowledge of energy conversion electricity taking into account compatibility requirements electromagnetic.		[SW1] Assessment of factual knowledge		
Subject contents	Sources and propagation of conducted add radiated disturbances. Electromagnetic emission and immunity of electrical devices. EMC in power electronics. EMC and LVD Directives, harmonized standards, certification tests of electrical devices. Electromagnetic interference limitation (grounding, shielding, filtration, separation, balancing). Basic anti-interference elements (capacitors, inductors, RFI filters, shields). Principles of designing electromagnetically compatible devices and installations. Sample analysis of typical problems related to EMC in electrical devices. Problems related to EMC in converter based drive systems. The influence of electrical equipment on the environment, living organisms and humans.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Laboratory reports		50.0%		50.0%		
	Active participation in the lecture		50.0%		50.0%		

Recommended reading	Basic literature	Charoy A.: Zakłócenia w urządzeniach elektronicznych: zasady i porady instalacyjne. Tomy: 1 - 4, WNT 1999, 2000. Konczakowska A., Spiralski L., Hasse L., Kołodziejski J.: Zakłócenia w aparaturze elektronicznej. Radioelektronik Sp. z o.o., Warszawa 1995. Więckowski T.W.: Badania kompatybilności elektromagnetycznej urządzeń elektrycznych i elektronicznych. Wrocław 2001. A. Kempki: Elektromagnetyczne zaburzenia przewodzone w układach napędów przekształtnikowych. Oficyna Wydawnicza Uniwersytetu Zielonogórskiego 2005.
	Supplementary literature	Henry W. Ott: Electromagnetic Compatibility Engineering. John Wiley & Sons, 2011 R. Smoleński: Conducted Electromagnetic Interference (EMI) in Smart Grids. Springer 2012. J. Łuszcz: High Frequency Conducted Emission in AC Motor Drives Fed By Frequency Converters: Sources and Propagation Path. John Wiley & Sons 2018.
	eResources addresses	Podstawowe https://www.emcstandards.co.uk/emcacademy - A website presenting the range of issues related to the electromagnetic compatibility of electrical devices. Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Checking the immunity of electronic devices to electromagnetic disturbances	
Work placement	Not applicable	