



## Subject card

Subject name and code	Industrial electric instalations with power electronic converters, PG_00024344						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2022/2023		
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 Controlled Electric Drives -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Mirosław Włas				
	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		25.0	50
Subject objectives	The course aims to familiarize students with designing, commissioning and operation of the electrical drives of power electronics converters.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_U02		The student presents the results of his/her work orally.		[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task		
	K7_W01		The student calculates parameters of power drive systems and selects components of power drive systems		[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		
	K7_U03		student solves problems on the basis of source materials and documentation available on the websites of manufacturers of automation		[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		
	K7_W02		the student has in-depth knowledge of industrial automation, electrical installations and drive systems		[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		
Subject contents	The main contents of an industrial design of electrical installations with frequency converters and programmable controllers. General characteristics of industrial low voltage installation. The types of objects industrialists of power electronics converters. Overview of the types of equipment used in the electronics industry. Rules for selection of cables and cameras and security to power electronic devices. I & C equipment supply methods. Selection of control equipment and control instrumentation. Methods for connecting drive systems from frequency converters, including working with a common DC link. Converters with the return of power to the grid. Protection against disturbances and electromagnetic interference. Protection against ground faults and power symmetry. Setting security in frequency converters. Setting the parameters of frequency converters. Machinery Directive, the security categories and categories detention. Protection against electric shock. Ways to create projects and drawing diagrams industrial automation.						
Prerequisites and co-requisites	Subject is the successor to the subject "Industrial Information Network" and "Automatic Electric Drives".						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Raport		50.0%		100.0%		

Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. J. Szmajdziński: Co warto wiedzieć o napięciowych przemiennikach częstotliwości Wydawnictwo Politechniki Rzeszowskiej 2001</li> <li>2. Ptaszyński: Przetwornice częstotliwości Wyd. ENVIROTECH, Poznań 1996</li> <li>3. P. Drozdowski: Wprowadzenie do napędów elektrycznych Wyd. Politechnika Krakowska, Kraków 1998</li> </ol>
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Niestępski S., Parol M. i In.: Instalacje Elektryczne Budowa, Projektowanie i Eksploatacja Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001</li> <li>2. Wiatr J.: Poradnik Projektanta Elektryka Dom Wydawniczy Medium Warszawa 2006.</li> <li>3. Jakuszcowski R.: Programowanie systemów SCADA. WPK J. Skalmierskiego, Gliwice 2002</li> </ol>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Design and execution of laboratory with PLCs Siemens S7-300 PLC (object model in Matalbie, controlling PLC) (position 10)</li> <li>2. The laboratory for temperature and pressure with visualization on a PC. (VIPA Speed7- position 8)</li> <li>3. The design and construction of the conveyor belt drive model (Mitsubishi st. 9).</li> <li>4. Installation and commissioning of passenger lift model (Schneider PLC M340 st. 10)</li> <li>5. Visualization and control model of centrifuge food drive system.  (st. 3, the drive Altivar, Modbus RTU)</li> <li>6. Drive cargo-passenger elevator with induction motor.  (st. 7 converter FCM 300, PLC - Moeller XC-200)</li> <li>7. Model pumping.  (st. 3, converter, ABB, Siemens S1200 driver)</li> <li>8. Control 3 axis milling plotter.  (st. 1 servo and stepper motors and the PLC B &amp; R)</li> <li>9. Model rewinding machines for paper converters Danfoss FC302 and the controller XC-200 Moeller. (Position 7)</li> <li>10. The laboratory to control the ventilation function of temperature. (VIPA SPEED7 - position 10)</li> </ol>	
Work placement	Not applicable	