



Subject card

Subject name and code	Diagnostics and Condition Monitoring, PG_00053430						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2023/2024		
Education level	first-cycle studies		Subject group				
Mode of study	Part-time studies		Mode of delivery		at the university		
Year of study	4		Language of instruction		Polish		
Semester of study	7		ECTS credits		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Metrology and Information Systems -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Tomasz Ciszewski				
	Teachers		dr inż. Tomasz Ciszewski				
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		4.0		41.0	75
Subject objectives	Mastering the basic knowledge of the theory of diagnostic measurements as well as methods and measurement and diagnostic systems used in electrical engineering.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U05		the student has the necessary preparation to work in an industrial environment and applies the principles of occupational health and safety		[SU4] Assessment of ability to use methods and tools		
	K6_K05		student is able to react in emergency situations, threats to health and life with the use of electrical devices		[SK1] Assessment of group work skills		
	K6_K01		the student is aware of the need for continuous training and self-improvement in the field of the electrician profession and knows the possibilities of further education		[SK1] Assessment of group work skills		
Subject contents	LECTURE General problems of diagnostics. Economics of diagnostics. Vibroacoustic diagnostics. Ultrasound diagnostics. Thermal imaging diagnostics. Diagnostics of electrical machines. Object monitoring. Equipment used in the measurement part of the system (acquisition systems, PXI standard, connecting measuring instruments with standard interfaces). Software for measurement procedures (programming methods, LabVIEW environment). W. Examples of measurement and diagnostic systems (diagnostics of control valves, diagnostics of traction motors). LABORATORY 1. LabVIEW environment for software of measurement procedures 2. Cooperation of measuring equipment with a computer 3. Measurement of the temperature field using a thermal imaging camera 4. Diagnostics of the rotor cage of an induction motor. 5. Machine damage testing with the use of vibration methods.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
			60.0%		40.0%		
			60.0%		60.0%		

Recommended reading	Basic literature	<p>1. Lesiak P., Świsulski D.: Komputerowa technika pomiarowa w przykładach. Agenda Wydawnicza SIMP, Warszawa 2002.</p> <p>2. Cempel C., Tomaszewski F.: Diagnostyka maszyn. Zasady ogólne. Przykłady zastosowań., ITE, Radom 1992.</p> <p>3. Praca zbiorowa (red. Madura H.). Pomiary termowizyjne w praktyce. Agenda Wydawnicza PAK, Warszawa 2004.</p>
	Supplementary literature	<p>1. Mikulik, Jerzy: Podstawowe systemy bezpieczeństwa w budynkach inteligentnych, Wydawnictwo Politechniki Śląskiej, Gliwice 2005.</p> <p>2. Nawrocki W.: Komputerowe Systemy Pomiarowe, WKŁ, Warszawa 2002</p> <p>3. Świsulski D.: Komputerowa technika pomiarowa. Oprogramowanie wirtualnych przyrządów pomiarowych w LabVIEW. Agenda Wydawnicza PAK, Warszawa 2005</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>1. Draw and describe the structure of the testing system. 2. Construction and operation of the sampling-memory system. 3. Describe the purpose of the IEC-625 bus transmission control line. 4. How to determine the optimal range of diagnostics in the enterprise. 5. The principle of operation of an analog ultrasonic flaw detector. 6. Arrange accelerometer mounting methods according to increasing frequency range. 7. Present and compare the basic configurations of the analog input path of the measurement signals acquisition card. 8. What is the resolution and range of analog-to-digital converter. 9. Bathtub curve describe characteristic points. 10. Discuss the structure and properties of an ICP accelerometer</p>	
Work placement	Not applicable	