



## Subject card

Subject name and code	Diagnostics and Monitoring, PG_00042191						
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			2023/2024		
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	4	Language of instruction			Polish		
Semester of study	7	ECTS credits			2.0		
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	0.0	0.0	0.0	15
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	15	2.0		33.0	50	
Subject objectives	Mastering the basic knowledge of technical diagnostics.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W06	Knowledge of methods of technical diagnostics of power equipment. Knowledge of vibration diagnostics of rotating machines. Ability to operate a thermal imaging camera and interpret measurement results.			[SW1] Assessment of factual knowledge		
	K6_U03	Knowledge of health and life hazards in an industrial environment.			[SU3] Assessment of ability to use knowledge gained from the subject		
Subject contents	LECTURE:  General issues of diagnostics. Problems of the economics of diagnostics. Vibroacoustic diagnostics. Ultrasound diagnostics. Thermal diagnostics. Diagnostics of electrical machines. Diagnostics of electronic modules. Object monitoring. Examples of measuring and diagnostic systems. Diagnostics and monitoring of energy devices, e.g. steam turbines, wind turbines, transformers.						
Prerequisites and co-requisites	Basic knowledge of electrical engineering.						
Assessment methods and criteria	Subject passing criteria	Passing threshold		Percentage of the final grade			
		60.0%		100.0%			

Recommended reading	Basic literature	<p>1. Cempel C., Tomaszewski F.: Diagnostyka maszyn. Zasady ogólne. Przykłady zastosowań., ITE, Radom 1992.</p> <p>2. Praca zbiorowa (red. Madura H.). Pomiary termowizyjne w praktyce. Agenda Wydawnicza PAK, Warszawa 2004.</p> <p>3. Orłowski Z. Diagnostyka w życiu turbin parowych. WNT, Warszawa 2001.</p>
	Supplementary literature	<p><a href="https://doi.org/10.3390/electronics11233885">https://doi.org/10.3390/electronics11233885</a></p> <p><a href="https://doi.org/10.3390/s23073731">https://doi.org/10.3390/s23073731</a></p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. List and briefly describe the four basic ways of servicing devices.</li> <li>2. The principle of operation of the thermal imaging camera.</li> <li>3. The principle of operation of the ultrasonic flaw detector.</li> <li>4. Describe the construction and principle of operation of a piezoelectric accelerometer.</li> <li>5. Discuss the similarities and differences between monitoring and diagnostics.</li> </ol>	
Work placement	Not applicable	