



## Subject card

Subject name and code	Diagnostics and operation of energy devices , PG_00055915						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject				2025/2026	
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 no applied	
Semester of study	7	ECTS credits				1.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jerzy Głuch					
	Teachers						
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		1.0		9.0	25
Subject objectives	Familiarizing students with methods of diagnosing the technical condition of power equipment						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_K04] is able to formulate opinions on technical and technological processes in energy and sanitary engineering	The student is able to identify thermal power plants and their operating models	[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work
	[K6_W12] has basic knowledge of the life cycle and repairs of energy equipment in the field of thermal power stations, thermal and energy systems and heating systems, internal combustion engines and compressors as well as rotating machines	The student is able to indicate the methods of planning the repair on the basis of monitoring the operation of the equipment	[SW1] Assessment of factual knowledge
	[K6_W13] has basic knowledge of the operation of energy equipment in the field of thermal power plants, thermal and energy and heating systems, internal combustion engines, compressors and rotating machines, has basic knowledge of the regulation of energy equipment and methods of their selection depending on the needs	The student is able to determine the indicators of correct operation of the device for various loads	[SW1] Assessment of factual knowledge
	[K6_W06] knows classic and developmental energy technologies, rules for the selection and operation of heat and energy devices and installations, basic principles of energy systems operation, basic issues regarding the reliability of energy devices and diagnostics, environmental effects of energy technologies used, methods of using renewable energy sources	The student is able to find methods for assessing the efficiency of the operation of power equipment	[SW3] Assessment of knowledge contained in written work and projects
Subject contents	Introduction, thermodynamic and mechanical measurements in industry, industrial measuring devices, distributed control systems DCS, methods of technical diagnostics, methods of process diagnostics		
Prerequisites and co-requisites	Basic knowledge of thermal power plants, thermodynamics, fluid mechanics, automatic control methods		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written test	60.0%	100.0%
Recommended reading	Basic literature	1. Augustyn J.: Inteligentne karty pomiarowe w szybkich systemach diagnostyki, Pomiary Automatyka Kontrola, nr 2/1999, s. 5-7. 2. Boczek F., Dyrda B.: Obliczenia eksploatacyjne PERFORMANCE CALCULATION, Energetyka nr 12/1996, s. 703-707. 3. Bolikowski J.: Inteligentne przetworniki pomiarowe w diagnostyce procesów przemysłowych, W: (Materiały) II Krajowa Konferencja DPP97, Łagów, 8-11, września, 1997, s. 37-42. 4. Boroń W.: Charakterystyka zdecentralizowanych układów sterowania, Pomiary Automatyka Kontrola nr 6/1998, s. 203-206.  5. Chmielniak T.: Miary oceny efektywności termodynamicznej siłowni cieplnych, W: (Materiały) II Konferencja PBEC95, Warszawa: Wyd. Politechniki Warszawskiej, Z. 6, 1995, s. 41-50. 6. Fatek J., Warsza Z.: Aparatura do pomiarów poziomu i przepływów, Pomiary Automatyka Kontrola Nr 6/1998, s. 260-263. 7. Fodemski T. R., i inni: Pomiary cieplne. Cz. I i II, Warszawa: WNT 2001, 826 s. 8. Gładys H., Matla R.: Praca elektrowni w systemie energetycznym, Warszawa: WNT 2004, 365 s. 9. Głuch J.: Kontrola pomiarów ciepłno-przepływowych w systemach DCS złożonych obiektów energetycznych, W: (Materiały) Konferencja DPP05, Rajgród, 12-14.09.2005, Pomiary Automatyka Kontrola Wyd. Specjalne, 09/2005, s. 170-172. 10. Głuch J. redakcja i inni: Diagnostyczne relacje cieplno-przepływowe w ruchowych warunkach przemysłowych, Wydawnictwo Wydziału Oceanotechniki i Okrętownictwa PG, s.172. 11. Jaworski J.M.: Błąd i niepewność przyrządów pomiarowych, Pomiary Automatyka Robotyka, nr 11/1999, Listopad, 1999, s. 5-7. 12. Kościelny J. M.: Zdecentralizowane systemy automatyki (DCS) dla dużych instalacji technologicznych, Pomiary Automatyka Kontrola Nr 6/1998, s. 194.	

	Supplementary literature	<p>1. PN: Polska Norma PR: PN-EN 60953-1: PR: PN-IEC953-1, PR: PN-EN 60953-2: PR: PN-IEC953-2., Wymagania dotyczące cieplnych badań odbiorczych turbin parowych. Arkusz 1 i 2: Metoda A i B, Grudzień 1998.</p> <p>2. Szargut J.: Rachunek wyrównawczy w technice ciepłej, Wrocław: Ossolineum 1984, 215 s.</p> <p>3. Witoś M.: Diagnostowanie toru pomiarowego w rozproszonych systemach kontroli, W: (Materiały) V Krajowa Konferencja DPP2001, Łagów 17-19.09.2001, s. 377-380.</p> <p>4. Zimmermann R.: Automatyczna centralizacja. Pomiary i obróbka danych, Warszawa: Wydawnictwo Ministerstwa Obrony Narodowej 1975, 369 s.</p> <p>5. Żółtowski B., Ćwik Z.: Leksykon Diagnostyki Technicznej, Bydgoszcz: Wydawnictwo Uczelniane Akademii Techniczno-Rolniczej 1996, 486 s.</p>
	eResources addresses	Adresy na platformie eNauzanie:
Example issues/ example questions/ tasks being completed	Define DCS system tasks	
Work placement	Not applicable	

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