



## Subject card

Subject name and code	Energy Auditing (WEiA), PG_00042097						
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				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	4		Language of instruction		English		
Semester of study	7		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Marcin Jaskólski				
	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		5.0		65.0	100
Subject objectives	The aim of the course is to acquire skills in technical and economic analysis of projects aimed at more efficient use of energy.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U05		They can perform a preliminary analysis of the profitability of the planned energy investment.		[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		
	K6_U01		They can use literature in English to complete a task.		[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		
	K6_W06		They can perform investment analysis of a classic and modern power generation system.		[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	Calculation of the amount of energy produced in the energy system. Calculation of the amount of electricity consumed. Energy consumption profiles. Power generation profiles. Profitability analysis for a project aimed at more efficient use of energy: discounting, averaging in the discount account, depreciation and cost of equity, bank loans and related costs, weighted average cost of capital WACC , analysis of annual costs, assessment of operating costs in the energy sector, static and dynamic profitability methods, accounting rate of return ARR, break-even point BEP, net present value NPV, internal rate of return IRR, discounted payback period DPBP, levelised cost of electricity LCOE.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Final test		60.0%		50.0%		
	Techno-economic analysis		60.0%		50.0%		

Recommended reading	Basic literature	<p>NEA, IEA, Projected costs of generating electricity 2015 edition</p> <p>European Standard Energy Audits (EN 16247-1)</p> <p>Thumann A., Dunning S., Plant Engineers and Managers Guide to Energy Conservation, CRC Press, 2011</p>
	Supplementary literature	<p>Jaskólski M., Modelling long-term technological transition of Polish power system using MARKAL: Emission trade impact, Energy policy 97 (2016), pp. 365-377</p> <p>Jaskólski M., Reński A., Minkiewicz T., Thermodynamic and economic analysis of nuclear power unit operating in partial cogeneration mode to produce electricity and district heat, Energy 141 (2017), pp. 2470-2483</p> <p>D. Kirschen, G. Strbac, Fundamentals of power system economics, John Wiley &amp; Sons, Ltd, Chichester, 2004. doi:10.1002/0470020598.</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>1. Calculate the annual costs of generating electricity in a nuclear power plant.</p> <p>2. Calculate the unit cost of generating electricity in a wind farm.</p> <p>3. Calculate the capital costs for the investment consisting in the construction of a coal-fired power plant.</p> <p>4. Calculate the net present value of the steam and gas power plant at the set values of technical and economic indicators.</p>	
Work placement	Not applicable	