



Subject card

Subject name and code	Energy Supply Systems, PG_00042317						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2024/2025		
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			3.0		
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. Tomasz Minkiewicz				
	Teachers		dr inż. Alicja Lenarczyk				
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	7.0		48.0	75	
Subject objectives	The aim of the course is to provide students with knowledge of energy supply systems, with particular emphasis on the electricity and heat sector.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W02] has an in-depth and structured knowledge of electrical measurements electrical measurements, the methods and equipment used for electrical measurements of non-electrical quantities, he/she knows the principles of testing operation tests of electrical equipment, has a structured knowledge of electricity quality issues	not applicable to the subject			[SW1] Assessment of factual knowledge		
	[K7_W05] has detailed knowledge of the regulatory processes in the electricity system electricity safety and electricity safety automation	Defines the structure of the power system and identifies factors affecting its reliability and security.			[SW1] Assessment of factual knowledge		
	[K7_U02] is able to prepare and deliver a short oral presentation on a selected technical topic	not applicable to the subject			[SU1] Assessment of task fulfilment		
	[K7_U03] is able to obtain information from literature, databases and other sources, also in English, draw conclusions, formulate and fully justify opinions. substantiate opinions; is able to identify directions for further learning and implement the process of self-education	Calculates selected indicators related to the operation of power plants and combined heat and power plants. Basing on information from the literature, defines the impact of specific parameters on the obtained results.			[SU1] Assessment of task fulfilment		

Subject contents	<p>Lecture: Types of energy and efficiency. Resources of selected energy carriers. Structure and functioning of the power system. Process of generating electricity and heat. Structure and functioning of the thermal energy sector. Development and construction of heating systems. Electrification of heating and heat storage.</p> <p>Laboratory: Load curves. Enthalpy and entropy. Thermal cycles in power plants and combined heat and power plants. Heat-flow calculations of heat distribution network.</p>		
Prerequisites and co-requisites	<p>Good knowledge of basic physics (basic laws of physics, physical quantities and their units and measures, mechanics, electrical engineering, thermodynamics, heat transfer). Knowledge of energy processes' properties: efficiency of single conversion, efficiency of conversion cycle and thermodynamic cycle efficiency. Basic knowledge of mathematics: algebra, geometry, trigonometry, differential and integral calculus.</p>		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture test	60.0%	60.0%
	Laboratory reports	60.0%	40.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Kamrat W. (red.), Gospodarka energetyczna w warunkach rynkowych. Warszawa: Wydawnictwo Naukowe PWN, 2023, 375 s. ISBN 978-83-01-22583-4 2. Pawlik M., Strzelczyk F., Elektrownie. Warszawa: Wydawnictwo WNT, 2024, 716 s. ISBN 978-83-01-18954-9 3. Chmielniak T., Technologie energetyczne. Warszawa: Wydawnictwo Naukowe PWN, 2021, 524 s. ISBN 978-83-01-21694-8 4. Paska J., Wytwarzanie energii elektrycznej. Warszawa: Oficyna Wydawnicza Politechniki Warszawskiej, 2020, 334 s. ISBN 978-83-8156-094-8 5. Marecki J., Podstawy przemian energetycznych. Warszawa: Wydawnictwo WNT, 2023, 210 s. ISBN 978-83-01-19361-4 	
	Supplementary literature	<ol style="list-style-type: none"> 1. Szkarowski A., Łatkowski L., Ciepłownictwo. Warszawa: Wydawnictwo WNT, 2019, 344 s. ISBN 978-83-01-20619-2 2. Amanowicz Ł., Bagieński Z., Ciepłownictwo. Projektowanie kotłowni i ciepłowni. Poznań: Wydawnictwo Politechniki Poznańskiej, 2018, 340 s. ISBN 978-83-7775-519-8 3. Kamler W., Ciepłownictwo. Warszawa, Wydawnictwo PWN, 1979, 902 s. 	
	eResources addresses	<p>Podstawowe</p> <p>https://www.are.waw.pl/ - Statistical data concerning the functioning of the electricity and heat sector in Poland.</p> <p>https://www.forum-energii.eu/ - Information about the electricity and heat sector.</p> <p>https://www.pse.pl/ - Information about the structure and operation of the Polish power system.</p> <p>Uzupełniające</p> <p>Adresy na platformie eNauczanie:</p> <p>SYSTEMY ZAOPATRZENIA W ENERGIĘ [Niestacjonarne][2024/25] - Moodle ID: 44618</p> <p>https://enauzanie.pg.edu.pl/moodle/course/view.php?id=44618</p>	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Characteristics of the Power System. 2. Factors affecting the operational security of the power system 3. Tasks and demands of centralized and regional operating energy supply systems. 4. Heat carriers and their parameters. 5. Elements of thermal and hydraulic calculations. 		
Work placement	Not applicable		

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