



Subject card

Subject name and code	The impact of energy sector on the climate, PG_00064772						
Field of study	Power Engineering						
Date of commencement of studies	February 2025	Academic year of realisation of subject				2025/2026	
Education level	second-cycle studies	Subject group				Specialty 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	1	Language of instruction				Polish	
Semester of study	2	ECTS credits				3.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Zakład Systemów i Urządzeń Energetyki Ciepłej -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Dariusz Mikielewicz					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	15.0	0.0	45
	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	45		5.0		25.0	75
Subject objectives	The aim of the course is to familiarise students with the impact of energy systems on the climate and its anthropogenic changes.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W01] explains and describes, based on general knowledge in the field of scientific disciplines forming the theoretical foundations of Power Engineering, the structure, principles of operation and environmental impact of energy systems, machines and devices, transmission grids and internal installations	Has knowledge of exergetic analysis with environmental cost analysis. Knows the effects of fossil fuel combustion on environmental contaminants			[SW1] Assessment of factual knowledge		
	[K7_U02] formulates and tests hypotheses concerning problems related to energy conversion processes, their efficiency, control, safety and impact on the environment, as well as simple research problems	Is familiar with the energy strategies of Poland, the European Union and global agreements in the area of anticipated energy mixes and the prevention of climate change			[SU2] Assessment of ability to analyse information		
Subject contents	<p>1. Basic statistics on energy consumption in Poland, the EU and worldwide. Basic treaties introducing emission limitations. Energy policy of Poland, the EU and the world.</p> <p>2. Characteristics of the formation of the atmosphere and its changes over time. Models for determining the equilibrium temperature.</p> <p>3. Causes and mechanisms of climate change.</p> <p>4. Exergy and the determination of the environmental cost.</p> <p>5 Determination of the carbon footprint of different energy technologies</p> <p>6. Prospective low carbon technologies and opportunities for decarbonisation of the Polish economy.</p>						
Prerequisites and co-requisites	Knowledge of thermodynamics I and II especially in the area of therodynamic cycles.						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	tutorials credit colloquium	60.0%	30.0%
	lecture credit colloquium	60.0%	30.0%
	project presentation	60.0%	40.0%
Recommended reading	Basic literature	Lecture notes	
	Supplementary literature	Any literature on the influence of energy on climate change	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Composition of the atmosphere at the beginning of the world's formation and at present 2. Causes of climatic forcing 3. Main greenhouse gases, their lifetime in the atmosphere, reasons for their presence in the atmosphere 4 Definition of the equilibrium temperature of the earth's surface 5. Energy balance model of the earth without and with the atmosphere 6 Definition of albedo 7. Basic combustion reactions of primary fuels 8 Definition of exergy and unit costs of energy technologies 9. Causes of acid rain 10. Causes of smog. 11. Examples of low carbon technologies 		
Work placement	Not applicable		

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