GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00058646		
Field of study	Power Engineering		
Date of commencement of studies	February 2024	Academic year of realisation of subject	2024/2025
Education level	second-cycle studies	Subject group	
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 Ogrzewnictwa, Wentylacji, Klimatyzacji i Chłodnictwa -> 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	30.0	0.0	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	8.0	22.0	75

Subject objectives

The student describes the design and theoretical basis of operation of heat sources applied in local systems. Student designs heating systems with low efficiency. Student identifies selected problems occurring during their operation.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W07] knows the environmental effects of energy technologies used; is familiar with the issues of effective energy management and use of renewable energy sources, has a broad and well-established knowledge of the processes of energy production and use	The student knows the environmental effects of the energy technologies used; knows the issues of energy efficiency and the use of renewable energy sources, has extended and well-established knowledge about the processes of energy production and use	[SW1] Assessment of factual knowledge
[K7_U05] is able to integrate technical and economic analysis of the use of various energy technologies, including technologies using renewable energy sources and conventional and nuclear energy	The student is able to integrate the technical and economic analysis of the use of various energy technologies, including technologies using renewable energy sources and conventional and nuclear energy	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
[K7_W06] knows the extended issues of reliability of power equipment and diagnostics of defects in this equipment	The student knows the extended issues regarding the reliability of power equipment and fault diagnostics in these devices	[SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Methods of heat transfer intensification in recuperators.

Waste energy - types, ways of development, media quality measures, resource assessment indicators.

Issues of physical recuperation. Recovery boilers.

Basic issues of regenerators.

Heat recovery from the cooling systems of structures.

Chemical waste energy and technologies for its management. RDF fuel, utilization of polymer raw materials.

Methods of thermal energy storage.

Heat recovery methods in ventilation and air-conditioning installations.

Heat recovery from refrigeration systems.

Technical, legal and safety issues related to heat pumps.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Thermodynamics, heat transfer, heating and refrigerating technology.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Project</td><td>75.0%</td><td>50.0%</td></tr>
<tr><td>Written test</td><td>56.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Articles in professional magazines.</td></tr>
<tr><td>Supplementary literature</td><td>Conference materials.</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Describe methods for intensifying of heat transfer in recuperators.

Waste energy - types, methods of use, measures of media quality, resource assessment indicators.

Discuss methods for heat recovery from structural cooling systems.

Methods of heat storage.

Define heat recovery efficiency in ventilation and air conditioning systems.

Describe the chosen method of heat recovery in ventilation and air conditioning systems.

The idea and methods of heat recovery from refrigeration systems.

Types and basic properties of working media in heat pumps.

Legal obligations of heat pump operators.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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