GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00069819		
Field of study	Power Engineering, Power Engineering, Power Engineering		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2025/2026
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 none
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Fluid-Flow Machinery -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. 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	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	0.0	0.0	30

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_U14] integrates information obtained from literature and other properly selected sources, including those in a foreign language, creatively interpreting and critically evaluating them, and drawing conclusions	Student understand lecture and do a project taking into account knowledge from other subjects	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[K7_W12] identifies and interprets the main developmental trends and significant new achievements in the field of engineering and technical sciences and disciplines relevant to the course of study	Student understand modern engineering	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K7_K82] is equipped to participate actively in lectures, seminars and laboratory classes conducted in foreign language	Student can understand lecture in English language	[SK4] Assessment of communication skills, including language correctness
[K7_U82] is able to proficiently obtain and process information related to field of study and academic environment in foreign language at B2+ level of the Common European Framework of Reference for Languages (CEFR)	Student can be in interaction during lectures	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information

<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.
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.
Prerequisites
and</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>writing test</td><td>56.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>• Janiczek R. S., Eksploatacja elektrowni parowych, WNT, Warszawa 1992.
• Gundlach W. R., Maszyny przepływowe, T.1-3, PWN, Warszawa 1971.
• Jakubik A., Uszkodzenia niemechaniczne urządzeń cieplnych elektrowni, WNT, Warszawa 1974.
• Pluta Z., Podstawy teoretyczne fotochemicznej konwersji energii słonecznej, OWPW, Warszawa 2006,
• Gutkowski K, Butrymowicz D., Chłodnictwo i klimatyzacja, WNT, Warszawa 2007,
• Buczkowski R., Igliński B. Cichosz M., Technologie aeroenergetyczne, Wyd UMK, Toroń 2016.</td></tr><tr><td>Supplementary literature</td><td>Wójs K., Odzysk i zagospodarowanie niskotemperaturowego ciepła odpadowego ze spalin wylotowych, PWN, Warszawa 2015,

Technical Literature</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<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.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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