

## 。 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

Subject name and code	, PG_00061848								
Field of study	Environmental Engineering								
Date of commencement of studies	October 2023		Academic year of realisation of subject			2023/2024			
Education level	second-cycle studies		Subject group			Obligatory subject group in the field of study			
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			5.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Department Of Sanita Politechniki Gdańskie	ary Engineering 9j	y Engineering -> Faculty Of Civil And Environmental Engineering -> Wydziały						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Ewa Zaborowska							
	Teachers		dr hab. inż. Ewa Zaborowska						
			mgr inż. Agat	a Kubryńska-K	lorczak				
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Project		Seminar	SUM	
of instruction	Number of study hours	20.0	0.0	0.0	15.0		0.0	35	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	ig activity Participation ir classes includ plan		I didactic Participation in consultation hours		Self-study SUM		SUM	
	Number of study hours	35		6.0		86.0		127	
Subject objectives	The aim of the course is to provide knowledge about installations related to heat sources (heating water circuits, fuel and exhaust installations, ventilation and water and sewage installations in the heat source room), legal regulations and standards, installation materials and criteria for their selection, basics of design, methods and technologies for implementing the installations in question.								
Learning outcomes	Course out	Subject outcome			Method of verification				
	[K7_W11] has knowledge to analyze, evaluate and optimize processes, objects and systems of environmental engineering and knows the principles of rational energy management and resources		Has the knowledge to analyze, evaluate and optimize heat sources, knows principles of rational energy management			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge			
	K7_U10		Can design a complex heat source			[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task			
	K7_W06		Has in-depth, structured and theoretically based knowledge related to the flow of media in heat systems			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge			
	K7_U12		Can analyze and evaluate solutions and functioning of installations related with heat sources			[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information			

Subject contents	Heat pumps, fuels, fuel installations/storage and combustion processes, boilers and boiler rooms, cogeneration, heating water circuits, combustion installations, accompanying installations in heat source rooms - ventilation, water and sewage.						
Prerequisites and co-requisites	Basics of hydraulics and thermodynamics. Knowledge in the range of heating and tap hot water systems. Drawing skills in AutoCAD. Knowledge from the subjects related to heating systems at the engineering level.						
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade				
	Written exam	50.0%	50.0%				
	Project	50.0%	50.0%				
Recommended reading	Basic literature	1. Lewandowski W.M.: Proekologiczne źródła energii odnawialnej, WNT, Warszawa 2006 etc 2. Zaborowska E.: Projektowanie kotłowni wodnych na paliwa ciekłe i gazowe. Wydawnictwo PG, Gdańsk 2012 etc. 3. Zalewski W.: Pompy ciepła sprężarkowe, sorpcyjne i termoelektryczne. IPPU Masta, Gdańsk 2001. 4. Legal acts and requiements. 5. Warunki techniczne COBRTI Instal, Warunki techniczne UDT.					
	Supplementary literature	1. Rubik M.: Pompy ciepła w systemach geotermii niskotemperaturowej. MULTICO Oficyna Wydawnicza, Warszawa 2011. 2. Skorek J., Kalina J.: Gazowe układy kogeneracyjne. WNT, Warszawa 2005 etc 3. Wiśniewski G. i in.: Kolektory słoneczne. Energia słoneczna w mieszkalnictwie, hotelarstwie i drobnym przemyśle. Dom Wydawniczy MEDIUM, Warszawa 2008. 4. Design guidelines and manufacturers' technical information.					
	eResources addresses	Adresy na platformie eNauczanie:					
		Instalacje źródeł ciepła-NST_2023/2024 (lato) - Moodle ID: 36956 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36956					
Example issues/ example questions/ tasks being completed	Design of a complex heat source,	Design of a complex heat source, including the use of renewable or hybrid energy sources.					
Work placement	Not applicable	Not applicable					

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