



Subject card

Subject name and code	, PG_00059116								
Field of study	Environmental Engineering								
Date of commencement of studies	October 2023	Academic year of realisation of subject		2025/2026					
Education level	first-cycle studies		Subject group		Optional subject group Subject group related to scientific research in the field of study				
Mode of study	Part-time studies		Mode of delivery		at the university				
Year of study	3		Language of instruction		Polish				
Semester of study	6		ECTS credits		4.0				
Learning profile	general academic profile		Assessment form		assessment				
Conducting unit	Department of Sanitary Engineering -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology								
Name and surname of lecturer (lecturers)	Subject supervisor Teachers		dr hab. inż. Ewa Zaborowska						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM		
	Number of study hours	15.0	5.0	0.0	10.0	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		3.0		68.0	101		
Subject objectives	The aim of the subject is to acquaint students with detailed knowledge in the range of heating networks, current regulations and standards related to the subject, materials types and selection criteria, designing methods and technologies of installation, including other than technical conditions. The subject objective is to acquire skills in the range of application of calculation methodology and the principles of designing.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K6_U16] can, when formulating and solving engineering tasks in environmental engineering, evaluate, select and apply appropriate methods and tools, recognize their non-technical aspects, including environmental, economic and legal aspects		Is able to select and apply appropriate methods and tools when solving design tasks.			[SU4] Assessment of ability to use methods and tools			
	[K6_W07] has a structured and theoretically founded knowledge in the field of materials used in the sanitary industry, their physico-chemical properties; knows and understands the basic processes of their production		Has knowledge in the range of materials and fittings used for building district heating networks			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects			
	[K6_W11] has elementary knowledge of electrical devices and installations as well as basics of control and automation		Has basic knowledge in the range of alarm systems (leak detection) of district heating networks			[SW1] Assessment of factual knowledge			
	[K6_U13] knows the rules of application and can choose the materials of the sanitary industry		Knows the rules of application and is able to select materials for the sanitary industry in the field of heating networks			[SU3] Assessment of ability to use knowledge gained from the subject			
	[K6_U03] can prepare documentation regarding the implementation of an engineering task/project and prepare a text or presentation including a discussion of the results of the implementation		Can prepare documentation on the implementation of the heating network project			[SU5] Assessment of ability to present the results of task [SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject			

Subject contents	<p>Course content – lecture</p> <p>LECTURE: Classification, configuration and systems of heat distribution networks. Traditional and preinsulated, underground and over ground systems. Materials, components, fittings. Preinsulated systems characteristics. Monitoring systems. Methods of preinsulated underground pipes designing. Stress, elongation, compensators, fixed points. Compensation area. Branches, walls crossing, preinsulated fittings. Principles of assembling, joint sets. Pipes laying in excavation, distance from obstacles, buildings, other pipelines. Heat loss. Technical requirements, codes and standards. TUTORIALS/PROJECT: Project of a district heating preinsulated network. Location of fixed points, pipelines geometry, dimensioning of compensation area. Designing of branches, walls and underground obstacles crossings, pipes laying in excavation. Technical requirements and test.</p>				
Prerequisites and co-requisites	Basics of hydraulics, thermodynamics and heating systems.				
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade		
	Project	50.0%	50.0%		
Recommended reading	Basic literature	<p>1. Randlov. P.: Podręcznik cieplownictwa system rur preizolowanych. European District Heating Pipe Manufactures Association, Fredericia, Dania 1998. 2. Żarski K.: Projektowanie preizolowanych sieci cieplnych w technologii ABB Zamech, ABB Zamech Ltd, Toruń 1994. 3. Regulations and standards related to the subject. <a href="http://isap.sejm.gov.pl/VolumeServlet?type=wdu">http://isap.sejm.gov.pl/VolumeServlet?type=wdu</a>. 4. Warunki techniczne wykonania i odbioru COBRTI INSTAL oraz PZITS. 5. Manufacturers guidelines, data sheets of fittings and devices, e.g.: <a href="http://www.zpum.pl/images/2_Wytyczne_do_Projektowania_2015.pdf">http://www.zpum.pl/images/2_Wytyczne_do_Projektowania_2015.pdf</a></p>			
	Supplementary literature	<p>1. Krygier K.: Sieci cieplownicze. Materiały pomocnicze do ćwiczeń. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2012. 2. Nantka M.: Ogrzewanie i cieplownictwo. Wydawnictwo Politechniki Śląskiej, Gliwice 2010 lub 2013. 3. Technical professional magazines.</p>			
	eResources addresses				
Example issues/example questions/tasks being completed	Design of an underground installation / heating network made of pre-insulated pipes				
Practical activites within the subject	Not applicable				

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