GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00059116		
Field of study	Environmental Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
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		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Ewa Zaborowska	
	Teachers	mgr inż. Agata Kubryńska-Korczak dr hab. inż. Ewa Zaborowska	

Lesson types and methods of instruction

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_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	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task
[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_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_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_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	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td colspan="3">LECTURE: Classification, configuration and systems of heat distribution networks. Traditional and preinsulated, underground and over ground systems. Materials, components, fittings. Preisulated 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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Basics of hydraulics, thermodynamics and heating systems.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Midterm colloquium</td><td>50.0%</td><td>50.0%</td></tr><tr><td>Project</td><td>50.0%</td><td>50.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">1. Randlov. P.: Podręcznik ciepłownictwa 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. http://isap.sejm.gov.pl/VolumeServlet?type=wdu. 4. Warunki techniczne wykonania i odbioru COBRTI INSTAL oraz PZITS. 5. Manufacturers guidelines, data sheets of fittings and devices, e.g.: http://www.zpum.pl/images/2_Wytyczne_do_Projektowania_2015.pdf</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">1. Krygier K.: Sieci ciepłownicze. Materiały pomocnicze do ćwiczeń. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2012. 2. Nantka M.: Ogrzewnictwo i ciepłownictwo. Wydawnictwo Politechniki Śląskiej, Gliwice 2010 lub 2013. 3. Technical professional magazines.</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:
Infrastruktura ciepłownicza-NST_2024/2025 (lato) - Moodle ID: 44515
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44515</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">Design of an underground installation / heating network made of pre-insulated pipes</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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