



Subject card

Subject name and code	, PG_00059188						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2026/2027		
Education level	first-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	4		Language of instruction		Polish		
Semester of study	7		ECTS credits		6.0		
Learning profile	general academic profile		Assessment form		exam		
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		dr hab. inż. Ewa Zaborowska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	10.0	0.0	15.0	0.0	40
	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	40		8.0		102.0	150
Subject objectives	The aim of the subject is to acquaint students with detailed knowledge in the range of heating substations,current regulations and standards related to the subject, materials types and selection criteria, methods andtools supporting designing process, methods and technologies of installation, including other than technical conditions. The subject objective is to acquire skills in the range of utilising and converting different sourcesof information, application of calculation methodology and the principles of designing.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U11] can use selected computer programs to support design, including CAD graphics programs		Can use selected computer programs supporting design (e.g., heat exchangers selection)		[SU4] Assessment of ability to use methods and tools		
	[K6_W09] has ordered, theoretically founded knowledge in the field of water supply, sewage, heating, ventilation and air conditioning, and the principles of shaping the microclimate of rooms; knows legal regulations, standardization issues and recommendations for the design of water supply, sewage, heating and gas networks and installations		Has an ordered and theoretically founded knowledge in the field of heating, knows design recommendations		[SW1] Assessment of factual knowledge		
	[K6_U12] can design installations, networks and facilities: water supply, sewage, heating and gas		Knows how to design a heating substation		[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment		

Subject contents	Course content – lecture		
	Lectures: Heating substations classification. Direct and indirect heating substations. Hydraulic schematic diagrams. Heat exchange and heat exchangers. Functional modules of heating substations. Fittings, devices and piping. Automatic control system. Safety device. Filling and refilling water system. Heating substationrooms. Water and wastewater installations in heating substation room. Regulations, standards, technical requirements. Technical requirements and tests. Heating energy tariffs and costs.		
	Course content – exercises		
	Tutorials: Calculations in the range of heating substations, supporting project.		
	Course content – project		
	Project: Project of heating substation, joined to high-parametersdistrict heating network. Schematic, technological diagrams. Hydraulic calculations of primary and secondarycircuits. Fittings, devices and thermal insulation matching. Filling and refilling systems. Water, sewage and ventilation systems in a heating substation room. Presentation in the field of heating systems.		
Prerequisites and co-requisites	Basics of hydraulics and thermodynamics.		
Assessment methods and criteria			
	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	50.0%	40.0%
	Written exam	50.0%	60.0%
Recommended reading	Basic literature	1. Zaborowska E., Zasady projektowania wodnych węzłów ciepłowniczych. Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2010 ornext editions. 2. Żarski K.: Węzły ciepłe w miejskich systemach ciepłowniczych. Poradnik. Wyd. 2. Wydawnictwo Instal, Warszawa2014. 3. Regulations, Polish and European Standards related to the subject, COBRTI Instal technical requirements.	
	Supplementary literature	1. Wolski A., Kaiser K., Legionella w instalacjach budynków. Ośrodek Informacji Technika instalacyjna w budownictwie, Warszawa, 2009. 2. Wytyczne producentów, karty katalogowe armatury i urządzeń.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Project of a heating substation.		
Practical activites within the subject	Not applicable		

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