



Subject card

Subject name and code	, PG_00059110									
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		Obligatory subject group 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		dr inż. Nicole Nawrot							
	Teachers									
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM			
	Number of study hours	0.0	15.0	0.0	20.0	0.0	35			
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	35		6.0		60.0	101			
Subject objectives	The course's goal is to provide the knowledge in the field of thermal technology and heating required to design a heating installation, such as knowledge of the principles of hydraulic calculations of central heating installations, familiarity with current legal regulations and standards related to the topic, installation operation and equipment principles, and use of specialized nomenclature.									
Learning outcomes	Course outcome		Subject outcome		Method of verification					
	[K6_U12] can design installations, networks and facilities: water supply, sewage, heating and gas		Prepares a design for a central heating installation in a multi-family residential building.		[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject					
	[K6_U02] can work individually and in a team; knows how to estimate the time needed to complete the task ordered; is able to develop and implement a work schedule that ensures deadlines		When working alone on a project, the Student must stick to the timeline, yet when working in a group, the Student must follow collaboration guidelines.		[SU1] Assessment of task fulfilment					
	[K6_U11] can use selected computer programs to support design, including CAD graphics programs		The student creates drawings for technical documentation using CAD applications.		[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools					

Subject contents	<p>Course content – exercises Auditorium classes:</p> <p>Thermal resistance. Thermal resistance of homogeneous and heterogeneous layers. Heat transfer resistance. Thermal resistance of air layers (unventilated, poorly ventilated, well ventilated). Thermal resistance of unheated spaces (roof spaces, other spaces). Total thermal resistance of partitions composed of homogeneous and heterogeneous layers. Heat transfer coefficient. Heat transfer coefficient of homogeneous and heterogeneous layers. Calculation of the heat transfer coefficient of components with variable thickness. Calculation of the heat transfer coefficient of partitions, taking into account linear thermal bridges. Thermal resistance of the ground and heat transfer coefficient of partitions adjacent to the ground. Calculation of design heat loss through penetration of heated rooms. Heat demand for ventilation. Calculation of the total design heat loss of rooms and the design load of the entire building. Principles of hydraulic calculations of central heating installations.</p> <p>Project:</p> <p>Calculations of an individual design task consisting in determining the detailed demand for thermal power and thermal energy (heat) for a multi-family residential building. Designs of building partitions, thermal resistance of the air layer and ground. Heat demand of individual rooms according to the architectural background. Selection of ventilation air streams and calculation of heat demand for heating the ventilation air. Central heating installation design: Selection and arrangement of radiators. Settings of thermostatic radiator valves. Development of the central heating installation Line losses and local losses. Gravitational pressure and active gravity. Selection of the central heating circulation pump Central heating installation markings in the drawings. Discussion of the requirements for the technical description in the central heating installation design. Method of acceptance testing of installations.</p>									
Prerequisites and co-requisites	Drawing skills in AutoCAD. Knowledge of the subject Thermal technology of buildings and heating I.									
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="446 985 763 1012">Subject passing criteria</th><th data-bbox="763 985 1140 1012">Passing threshold</th><th data-bbox="1140 985 1486 1012">Percentage of the final grade</th></tr> </thead> <tbody> <tr> <td data-bbox="446 1012 763 1039">60.0%</td><td data-bbox="763 1012 1140 1039">25.0%</td><td data-bbox="1140 1012 1486 1039"></td></tr> <tr> <td data-bbox="446 1039 763 1066">100.0%</td><td data-bbox="763 1039 1140 1066">75.0%</td><td data-bbox="1140 1039 1486 1066"></td></tr> </tbody> </table>	Subject passing criteria	Passing threshold	Percentage of the final grade	60.0%	25.0%		100.0%	75.0%	
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Recommended reading	<p>Basic literature</p> <p>1. Krygier K., Klinke T., Seweryn J., Ogrzewnictwo, Wentylacja i Klimatyzacja. Wydawnictwa Szkolne i Pedagogiczne, Warszawa 1997.</p> <p>2. Ogrzewnictwo. Podstawy projektowania cieplnego i termomodernizacji budynków pod redakcją Haliny Koczyk. Wydawnictwo Politechniki Poznańskiej. Poznań 2000.</p> <p>3. Ogrzewnictwo praktyczne. Projektowanie, montaż, eksploatacja. Praca zbiorowa pod redakcją prof. dr hab. inż. Haliny Koczyk. Systherm Serwis, Poznań 2005.</p> <p>4. J.Albers, R.Dommel, H.Montaldo-Ventsam, H.Nedo, E.Uebelacker, J.Wagner, Systemy centralnego ogrzewania i wentylacji, Poradnik dla projektantów i instalatorów, Wyd. Naukowo- Techniczne, Warszawa 2007</p> <p>5. Norma PN-EN ISO 6946: 2008 Komponenty budowlane i elementy budynku. Opór cieplny i współczynnik przenikania ciepła. Metoda obliczania</p> <p>6. Norma PN-EN 12831: 2006 Instalacje ogrzewcze w budynkach. Metoda obliczania projektowego obciążenia cieplnego</p> <p>7. Rozporządzenie Ministra Infrastruktury z dnia 12 kwietnia 2002 r. w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie z późniejszymi zmianami</p>									
	<p>Supplementary literature</p> <p>Wymagania techniczne COBRTI INSTAL Zeszyt 2 Wytyczne projektowania instalacji centralnego ogrzewania Warszawa 2001</p>									
	<p>eResources addresses</p>									

Example issues/ example questions/ tasks being completed	<p>Oblicz opór cieplny elementu/ komponentu budowlanego.</p> <p>Podaj wartość ciśnienia roboczego w instalacji c.o.</p> <p>Podaj procedurę obliczania obciążenia cieplnego budynku.</p>
Practical activites within the subject	Not applicable

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