

Subject card

Subject name and code	Physics of Building Structures, PG_00044003								
Field of study	Civil Engineering								
Date of commencement of studies	October 2021		Academic year of realisation of subject			2022/2023			
Education level	first-cycle studies		Subject group			Obligatory subject group in the field of study			
						Subject group related to scientific research in the field of study			
Mode of study	Full-time studies		Mode of delivery			at the university			
Year of study	2		Language of instruction			Polish			
Semester of study	3		ECTS credits			2.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Department of Building Structures and Material Engineering -> Faculty of Civil and Environmental Engineering								
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Marek Krzaczek						
	Teachers		dr inż. Jarosław Florczuk						
			mgr inż. Sławomir Dobrowolski						
			dr hab. inż. M	<					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	15.0	15.0	0.0	0.0		0.0	30	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity Participation in classes including plan				Self-st	udy	SUM		
	Number of study hours	30		5.0		15.0		50	
Subject objectives	Buildings thermal protection. Moisture transport. Energy efficiency of buildings. Building acoustics.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K6_U12] knows rules of manufacturing and application of building materials, is able to properly choose tchem; is able to make simple laboratory experiments for judging quality of building materials		Ability to select building materials for construction building partitions with high thermal insulation						
			Ability to prepare the building's energy balance and calculate the building's energy demand						
	[K6_W01] has knowledge of selected branches of mathematics, physics and chemistry, which is a base of construction subjects, such as construction theory and material technology and id needed to formulate and solve typical problems of civil engineering		The ability to apply the basics of thermodynamics to assess the course of the heat transfer process in buildings						
	[K6_W12] Has basic knowledge on building physics, including heat and moisture migration in buildings, acoustics and energy demand		Understanding and mastering at the basic level the concepts and nature of the process of heat and mass transfer. Knowledge of thermal insulation criteria and the ability to calculate criteria values.						

Data wydruku: 05.04.2024 18:51 Strona 1 z 2

Subject contents	The process of heat and mass exchange. Convective heat exchange. Radiation heat exchange. Thermal conductivity. General equation of thermal conductivity. Model of unidirectional and stationary heat conduction. Model of two-dimensional and stationary heat flow. Thermal bridges. Theoretical basis and a model of building energy balance. Moisture flow mechanisms in building partitions. Relative air humidity. Water vapor condensation in building partitions. Water vapor condensation on the surfaces of building structure elements. Air exchange in the building. Air flow through the building envelope elements. The conditions of thermal and humidity comfort in the building. Renewable heat sources and methods of their use. Thermal insulation criteria. Methods of calculating thermal resistance, heat transfer coefficient, temperature distribution field and dew point temperature. Energy efficiency criterion. Methods for calculating the building thermal energy demand indicator: simplified method.						
Prerequisites and co-requisites	No requirements						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria		60.0%	45.0%				
		60.0%	55.0%				
Recommended reading	Basic literature	Bogosławski W.N.: Fizyka Budowli, Arkady, Warszawa 1975. Pogorzelski J.A., : Fizyka budowli, podstawy wymiany ciepła i masy, Wydawnictwo Politechniki Białostockiej, Białystok, 1987. Klemm P.:Budownictwo Ogólne. Fizyka Budowli, Tom 2, Arkady Warszawa, 2006.					
	Supplementary literature	Mikoś J.:Budownictwo ekologiczne. Wydawnictwo PolitechnikiŚląskiej, Gliwice, 1996. 2. Staniszewski B.: Wymiana ciepła Podstawyteoretyczne. PWN, Warszawa, 1980.					
	eResources addresses	Adresy na platformie eNauczanie: Fizyka Budowli (Budownictwo) - Rok akademicki 2022/2023 - Moodle ID: 25676 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=25676					
Example issues/ example questions/ tasks being completed	1. The temperature equalization coefficient in heat conduction is:a) The product of the thermal conductivity coefficient and thermal accumulation,b) The quotient of the thermal conductivity coefficient and thermal accumulation,c) The sum of the thermal conductivity and thermal accumulation coefficient.2. The value of the heat flux density in the physical system in which heat exchange takes place by means of a stationary and unidirectional conduction phenomenon:a) It varies and depends on the temperature,b) It changes and depends on the position in space,c) It is constant throughout the physical system.						
Work placement	Not applicable						

Data wydruku: 05.04.2024 18:51 Strona 2 z 2