



Subject card

Subject name and code	Building Physics, PG_00048915						
Field of study	Chemistry in Construction Engineering						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Energy Conversion and Storage -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Ewa Klugmann-Radziemska				
	Teachers		prof. dr hab. Ewa Klugmann-Radziemska				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	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 didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	30		5.0		15.0	50
Subject objectives	The aim is to familiarize students with the impacts of environment and proper design of buildings to face all the load and minimize its negative effects of external influences, simultaneously not to cause degradation of the environment, including: issues of thermal protection of buildings, protect the humidity of buildings, energy demand of buildings and the basics of acoustics.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W06		the student has knowledge of the design and construction of buildings				
	K6_W07		the student has knowledge of thermodynamics, in particular heat transfer				
	K6_W09		the student has knowledge of the physics of buildings, in particular the physical phenomena occurring in the building and its components				
Subject contents	Course content – lecture Thermal protection of buildings Advantages of effective insulation Heat exchange Basic quantities Heat conduction Heat conduction through building partitions Penetration through a single, single and multi-layer flat partition Radiation Thermal bridges Protection against moisture Air humidity Surface condensation of water vapor Forms of action of moisture on the building Calculation of heat demand for a building Conditions of thermal comfort Thermal resistance of the building partition Thermal conductivity Heat transfer coefficient Protection against condensation Energy-friendly house An energy-efficient house and a passive house Designing an energy-saving and passive house Active houses Acoustic protection Criteria for assessing acoustic insulation. Methods for measuring and calculating the acoustic insulation index. Fire resistance of buildings and fire resistance of structural elements - the basis of requirements. Renewable energy sources and methods of their use.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	colloquia		60.0%		50.0%		
	exam		60.0%		50.0%		

Recommended reading	Basic literature	1.Klemm P., Budownictwo Ogólne. Fizyka Budowli, Tom 2, Arkady Warszawa, 2006. 2.Bogusławski W.N., Fizyka Budowli, Arkady, Warszawa 1975. 3.Pogorzelski J.A., Fizyka budowli, podstawy wymiany ciepła i masy, Wydawnictwo Politechniki Białostockiej, Białystok, 1987. 4.Ostapiuk J., Wybrane zagadnienia z fizyki budowli. Część II. Fizyka cieplna. Szczecin 1990. 5.Mikoś J., Budownictwo ekologiczne. Wydawnictwo Politechniki Śląskiej, Gliwice, 1996. 6.Ickiewicz I., Sarosiek W., Ickiewicz J.: Fizyka budowli. Wybrane zagadnienia. Politechnika Białostocka, Białystok 2000. 7.Jasiczak J., Kuiński M., Siewczyńska M.: Obliczanie izolacyjności termicznej i nośności murowych ścian zewnętrznych. Wydawnictwo Politechniki Poznańskiej, Poznań 2005. 8.Kisielewicz T., Królak E., Pieniążek Z.: Fizyka cieplna budowli. Politechnika Krakowska, Kraków 1998. 9.Laskowski L., Ochrona cieplna i charakterystyka energetyczna budynku. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2005.
	Supplementary literature	10.Niedzielko J. Energoefektywny dom dostępny Oficyna wydawnicza Polcen, Warszawa 2012 11.Staniszewski B., Wymiana ciepła. Podstawy teoretyczne. PWN, Warszawa, 1980 12.Low energy buildings in Europe: current state of play, definitions and best practice, Brussels, 25 September 2009 13.PN-EN ISO 6946: Komponenty budowlane i elementy budynku. Opór cieplny i współczynnik przenikania ciepła. Metoda obliczania 14.PN-B-02402:1982 Ogrzewnictwo. Temperatury ogrzewanych pomieszczeń w budynkach 15.18. PN-B-02403:1982 Ogrzewnictwo. Temperatury obliczeniowe zewnętrzne. 16.Rozporządzenie Ministra Infrastruktury z dnia 12 kwietnia 2002 w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie: Dz. U Nr 75/2002- tekst ujednolicony po zmianach z dnia 5 lipca 2013 r., brzmienie od 1-01-2014 r. 17.PN-B-03406: Ogrzewnictwo. Obliczanie zapotrzebowania na ciepło pomieszczeń o kubaturze do 600 m ³ 18.Klugmann-Radziemska E., Odnawialne źródła energii. Przykłady obliczeniowe, Wyd. III, Wydawnictwo Politechniki Gdańskiej, 2009 19.PN-EN ISO 10456:2009 Materiały i wyroby budowlane. Właściwości cieplno-wilgotnościowe. Tabelaaryczne wartości obliczeniowe i procedury określania deklarowanych i obliczeniowych wartości cieplnych. 20.PN-EN ISO 10077-1:2007 Ciepłne właściwości użytkowe okien, drzwi i żaluzji. Obliczanie współczynnika przenikania ciepła. Część 1: Postanowienia ogólne.
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Enter the unit of thermal resistance of the building envelope. 2. Calculate the heat transfer coefficient U for a partition, the thermal resistance of which R is 3.5. 3. What is the design temperature outside and what does its value depend on? 4. Enter the unit of the EA building's seasonal heat demand indicator.	
Practical activities within the subject	Not applicable	

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