GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Building Physics, PG_00048915		
Field of study	Chemistry in Construction Engineering		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2022/2023
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		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Ewa Klugmann-Radziemska	
	Teachers	dr inż. Małgorzata Rudnicka	

Lesson types and methods of instruction

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

Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13122

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, simultanously 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	[SW1] Assessment of factual knowledge
K6_W07	the student has knowledge of thermodynamics, in particular heat transfer	[SW1] Assessment of factual knowledge
K6_W09	the student has knowledge of the physics of buildings, in particular the physical phenomena occurring in the building and its components	[SW3] Assessment of knowledge contained in written work and projects

Subject contents

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.Bogosławski 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 m3 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. Tabelaryczne wartości obliczeniowe i procedury określania deklarowanych i obliczeniowych wartości cieplnych. 20.PN-EN ISO 10077-1:2007 Cieplne właściwości użytkowe okien, drzwi i żaluzji. Obliczanie współczynnika przenikania ciepła. Część 1: Postanowienia ogólne.
	eResources addresses	Adresy na platformie eNauczanie:
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.	
Work placement	Not applicable	