

POLITECHNIKA KRAKOWSKA IM. TADEUSZA KOŚCIUSZKI

KARTA PRZEDMIOTU

obowiązuje studentów rozpoczynających studia w roku akademickim 2021/2022

Wydział Inżynierii Lądowej

Kierunek studiów: Budownictwo

Profil: Ogólnoakademicki

Forma studiów: stacjonarne

Kod kierunku: BUD

Stopień studiów: I

Specjalności: Bez specjalności - studia w języku angielskim

1 INFORMACJE O PRZEDMIOCIE

NAZWA PRZEDMIOTU	Fizyka budowli
NAZWA PRZEDMIOTU W JĘZYKU ANGIELSKIM	Physics of Building Structures
KOD PRZEDMIOTU	WIL BUD oIS C29 21/22
KATEGORIA PRZEDMIOTU	Przedmioty kierunkowe
LICZBA PUNKTÓW ECTS	2.00
SEMESTRY	4

2 RODZAJ ZAJĘĆ, LICZBA GODZIN W PLANIE STUDIÓW

SEMESTR	WYKŁAD	ĆWICZENIA AUDYTORYJNE	LABORATORIA	LABORATORIA KOMPUTERO- WE	PROJEKTY	SEMINARIUM
4	15	0	30	0	0	0

3 CELE PRZEDMIOTU

Cel 1 Introduction of the basic concepts regarding heat transfer, moisture, building spaces lighting and building acoustics.

Cel 2 Introduction of the students to physical phenomena connected with heat transfer description, ways of calculation of wall thermal characteristic, designing rules and basic measurement methods.

Cel 3 Introduction of the students to the forms of moisture appearance and transfer in building materials and walls, to the rules of wall calculation, design and measurement in this field.

Cel 4 Introduction of the basic issues regarding natural and artificial lighting of the building spaces.

Cel 5 Introduction to sound insulation and acoustical comfort.

4 WYMAGANIA WSTĘPNE W ZAKRESIE WIEDZY, UMIEJĘTNOŚCI I INNYCH KOMPETENCJI

1 Credits for Building Materials

5 EFEKTY KSZTAŁCENIA

EK1 Wiedza Student understands and is able to use correctly the concepts and quantities connected with heat transfer, building shell insulation and acoustics.

EK2 Umiejętności Student is able to calculate thermal resistance and heat transfer coefficient of the complex walls, calculate heat losses, draw wall temperature distribution diagram and conduct thermal diagnostics.

EK3 Kompetencje społeczne Student is able to make the conclusions regarding the results of his work. He is able to articulate his achievements in multi-media presentations.

EK4 Wiedza Student knows the basic issues associated with heat and moisture transfer.

6 TREŚCI PROGRAMOWE

WYKŁAD		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
W1	Introduction. Basic information about the Polish climate. Basic forms of the natural heat transfer. Surface heat transfer.	1
W2	Convective heat transfer, radiation. greenhouse effect. LE coating. Complex heat transfer at the wall surface. Surface thermal resistance.	1
W3	Thermal conductivity of building materials. Measured, declared and design values. Influence of the external conditions on thermal resistance of the building materials.	1
W4	Fourier's and Newton's equations. Total thermal resistance and thermal transmittance of the wall.	1
W5	Wall temperature distribution. Designing rules of the multilayer walls. Internal surface temperature.	1
W6	Multi-dimensional heat transfer. Linear and spot thermal transmittance. Account for extra losses through thermal bridges.	1
W7	Basic information about non-stationary heat transfer. Thermal stability of the walls and spaces. Energy saving by temporary internal temperature reduction.	1
W8	Economic aspects of thermal resistance of the heated buildings. Optimum insulation thickness.	1

WYKŁAD		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
W9	Water sorption in building materials. Sorption isotherm. Capillary condensation. A difference between capillary condensation and the dew point.	1
W10	Vapour diffusion in the air and in the building materials. Air relative humidity. Water vapour resistance factor, water vapour diffusion-equivalent air layer thickness. Real and saturated vapour pressure.	1
W11	Interstitial condensation conditions within the wall. Calculated maximum amount of moisture, moisture accumulation.	1
W12	The rules of selection, design and evaluation of the walls because of moisture.	1
W13	Wetting effect. Concave meniscus. Conditions of capillary action. Significance of capillary action for moisture condition of the building wall.	1
W14	Basic concepts and units in building acoustics; Human hearing mechanism and risk hearing loss; Reflection and absorption of sound; Transmission of sound in buildings; Building acoustics standards	1
W15	Laboratory and terrain sound insulation measurements. Air-borne sound insulation; Impact sound insulation; Transmission of sound in open space.	1

LABORATORIA		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
L1	Temperature definition, scales, measurement methods and tools, bimetallic and resistance thermometer. Thermocouple: single and differential circuit	4
L2	Remote measurement of temperature. Pyrometer, infra-red camera. Interpretation of thermal images	2
L3	Calculation of the wall thermal resistance and transmittance according to EN ISO 6946.	1
L4	Calculation of the complex wall thermal resistance and transmittance according to EN ISO 6946.	1
L5	Temperature distribution in the wall section. Corrected thermal transmittance. Computational exercise topic. . Temat ćwiczenia obliczeniowego.	2
L6	Saturated and non-saturated air. Principles and instruments for relative humidity measurement. elektryczną. Higrometer, psychrometer.	3
L7	The principles of the moisture content calculation according to EN ISO 13788.	4
L8	Water vapour distribution in building shell	2

LABORATORIA		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
L9	Moisture content assessment of a building wall according to the building code regulations.	2
L10	Thermal resistance measurement - method and instrument. Measurement in real conditions.	2
L11	Basic lighting parameters. Luminance and lighting intensity (illumination) in educational spaces.	2
L12	Noise level measurements. Airborne sound insulation measurements	2
L13	Structure borne sound insulation measurements. Reverberation time measurements.	2
L14	Final test and exercise receipt.	1

7 NARZĘDZIA DYDAKTYCZNE

N1 Lectures

N2 Laboratory

N3 Discussion

N4 Multimedia presentations

N5 Presented examples

N6 Consultations

N7 Design exercise