



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physics of Buildings

### Course

Field of study

Civil Engineering First-cycle Studies

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

18

Laboratory classes

0

Other (e.g. online)

0

Tutorials

10

Projects/seminars

0

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

dr inż. Barbara Ksit

Responsible for the course/lecturer:

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tel. 48 61 6652864

WILiT

Piotrowo 5, Poznań

### Prerequisites

Basic knowledge of building materials, physics and basic methods of mathematical analysis

Students can: use-programs Excel (basic features) identify and describe building materials and their basic physical characteristics, can provide a layer of individual partitions, understands the basic laws governing the flow of heat

Awareness of the need to constantly update and supplement knowledge construction and engineering skills. Understand the need for lifelong learning and knows how to interact and work in a group, taking the different roles.



### Course objective

Extending and deepening the knowledge of thermodynamics and hygrometry, to the course is to familiarize students with the methods of calculation of thermal and moisture barriers, and building research methods and termorenowacyjnymi, damp-proofing, drying buildings and restore the insulation.

### Course-related learning outcomes

#### Knowledge

1. She/He knows and understand the work of a thermal barrier, knows the method of calculation - - [-P6S\_WG (I)]
2. She/He knows the research methods restoration, protection against moisture, drying buildings and restore the insulation. - - [-P6S\_WG (I)]
3. She/He knows matrieły and methods termorenowacyjne partitions - [-P6S\_WG (I)]
4. She/He knows the basic principles of heat transfer, ventilation of the building, - - [P6S\_WG (I)]

#### Skills

1. She/He can design a barrier (wall, roof etc) and calculate heat transfer coefficient - - [-P6S\_UW (O/I) P6S\_UK (O)]
2. She/He can choose the method of thermal renovation and waterproofing - - [-P6S\_UW (O/I) P6S\_UK (O)]
3. She/He can describe the phenomenon and analyze the causes of problems in the building mycological - - [-P6S\_UW (O/I) P6S\_UK (O)]

#### Social competences

1. She/He is acquires the ability to work in a team, - - [P6S\_KK (O) P6S\_KO (O) P6S\_KR (O)]
2. She/He is able to set priorities for the implementation of specific actions, - - [P6S\_KO (O) P6S\_KR (O)]

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Within the subject, classes are conducted as: lectures and exercises

as a form of measurement / evaluation of the student's work, the following are carried out:

Lectures:

\* final tests

Rating scale specified% from:

90 very good (A)

85 good plus (B)

75 good (C)



65 sufficient plus (D)

55 sufficient (E)

below 54 insufficient (F)

In doubtful cases, the credit is extended to the oral part.

Auditorium exercises:

final test in the last week of classes;

Continuous assessment of calculations of individual building partitions during each class

### Programme content

Lectures: Basics of heat transfer. Thermo-humidity properties of materials

construction. Thermal calculations of partitions, stationary and one-dimensional problems. Thermal calculations of partitions, multidimensional problems. Thermal bridges. Problems of non-stationary heat flow, thermal stability of partitions. Causes and types of moisture in the building, diffusion and condensation of water vapor. Principles of designing and manufacturing partitions that meet the standard requirements for thermal and humidity protection of the building.

Exercises:

calculation of heat transfer coefficients for different partitions. Determining the  $\alpha$ -frsi for the selected partition

### Teaching methods

Lecture / problem lecture / lectures with multimedia presentation

Exercises / exercises involving the use of professional literature, standard, Act.

### Bibliography

Basic

1. Praca zbiorowa pod kier. P. Klemma: Budownictwo ogólne t.2 wyd. Arkady 2005
2. Płoński, Pogorzelski : Fizyka budowli Arkady 1976
3. aktualne normy(PN-EN ISO 6946(2008,2017),PN-EN ISO 13370, PN-EN ISO 10211-1:1998,PN-EN ISO 13788:2017 )
4. Rozporządzenie Ministra Infrastruktury z 12 kwietnia 2002 w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie. (z późniejszymi zmianami)
5. Prawo Budowlne ( ost. zm. 2019)



Additional

1. B.Ksit, B.Monczyński - Zabezpieczenie elementów budynku znajdujących się w gruncie. Izolacje przeciwwilgociowe i przeciwwodne. Verlag Daschofer sp.z o.o.2011
2. B.Ksit, B.Monczyński - Izolacje przeciwwilgociowe i przeciwwodne dachów płaskich i tarasów. Verlag Daschofer sp.z o.o.2012
3. R.Wójcik - Docieplenie budynków od wewnątrz. medium Warszawa 2017
4. J.Jasiczak, M. Kuinski, M. Siewczyńska M.Gaczek- Obliczanie izolacyjności termicznej i nośność murowanych ścian zewnętrznych. Wyd. Politechniki Poznańskiej,
6. Nowoczesne wyposażenie domu jednorodzinnego, praca zbiorowa pod red. prof. dr hab. inż. Halina Koczyk, PWRiL Poznań

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	28	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	72	3,0

<sup>1</sup> delete or add other activities as appropriate