



Subject card

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|---|---|--|--|-------------------------------------|---|------------|-----|
| Subject name and code | , PG_00064625 | | | | | | |
| Field of study | Civil Engineering | | | | | | |
| Date of commencement of studies | October 2023 | | Academic year of realisation of subject | | 2024/2025 | | |
| Education level | first-cycle studies | | Subject group | | | | |
| Mode of study | Part-time studies | | Mode of delivery | | at the university | | |
| Year of study | 2 | | Language of instruction | | Polish | | |
| Semester of study | 3 | | ECTS credits | | 1.0 | | |
| Learning profile | general academic profile | | Assessment form | | assessment | | |
| Conducting unit | Department of Engineering Structures -> Faculty of Civil and Environmental Engineering | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | mgr inż. Sławomir Dobrowolski | | | | |
| | Teachers | | mgr inż. Sławomir Dobrowolski | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 10.0 | 10.0 | 0.0 | 0.0 | 0.0 | 20 |
| | 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 | 20 | | 0.0 | | 0.0 | 20 |
| Subject objectives | To learn about the process of heat and mass transfer in building partitions, as well as methods of calculating the quantities criteria (technical requirements) in the field of thermal insulation of building partitions and energy efficiency of buildings | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K6_W03] Demonstrate knowledge and understanding of the processes, established standards and design methods in the civil engineering subject area and of their limitations. | | Knowledge at a basic level basic of the nature of the of heat and mass exchange process. Knowledge of methods of reducing building's demand for thermal energy. Knowledge of Renewable energy sources Methods of their use. | | [SW2] Assessment of knowledge contained in presentation | | |
| | [K6_U04] Reads and prepares construction documentation (including drawings, graphic documentation in the CAD environment), efficiently uses maps as well as architectural, construction and geodetic drawings. | | The ability to analyze the design architectural design in terms of applied solutions concerning thermal insulation elements of the structure. | | [SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject | | |
| | [K6_U03] Design engineering objects and details, processes and engineering systems by applying appropriate standards and methods of design. | | Knowledge of the criteria thermal insulation and the ability to calculating the criterion quantities. Knowledge of the criterion energy efficiency and methods calculation of the magnitude of losses and gains of heat in a building. Knowledge of principles of designing the elements thermal insulation of the building. | | [SU3] Assessment of ability to use knowledge gained from the subject | | |
| Subject contents | The process of heat and mass exchange. Convective heat transfer. Radiative heat transfer. Thermal conductivity. General equation of thermal conductivity. Model of unidirectional and stationary heat conduction. Model of two-dimensional and stationary heat flow. Thermal bridges. Mechanisms of moisture flow in the building envelope. Relative humidity of the air. Condensation of water vapor in building partitions. Condensation of water vapor on the surfaces of elements of the building structure. Requirements for thermal protection of buildings in Poland. Methods of calculating thermal resistance, heat transfer coefficient, temperature field and dew point temperature. Energy certification. Energy performance of a building. | | | | | | |

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| Prerequisites and co-requisites | | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | | 60.0% | 50.0% |
| | | 60.0% | 50.0% |
| Recommended reading | Basic literature | 1. Bogosławski W.N.: Fizyka Budowli, Arkady, Warszawa 1975. 2. Pogorzelski J.A., : Fizyka budowli, podstawy wymiany ciepła i masy, Wydawnictwo Politechniki Białostockiej, Białystok, 1987. 3. Klemm P.: Budownictwo Ogólne. Fizyka Budowli, Tom 2, Arkady Warszawa, 2006. | |
| | Supplementary literature | 1. Mikoś J.:Budownictwo Śląskiej, Gliwice, 1996 2. Staniszewski B.: Wymiana Warszawa, 1980. | |
| | eResources addresses | Adresy na platformie eNauczanie: | |
| Example issues/ example questions/ tasks being completed | Test: 1. The solar air temperature value can be:a) Less than the air temperature value, measured with a dry thermometer,b) Greater than the value of the air temperature, measured with a dry thermometer, c) Equal to the value of the air temperature, measured with a dry thermometer. 2. In heat transfer by the conduction path, the heat flux density is:a) Proportional to the temperature gradient,b) Proportional to the thermal conductivity coefficient,c) Does not depend on the temperature. 3. The value of the heat flux density in a physical system in which heat transfer takes place by means of a stationary and unidirectional conduction phenomenon: a) Varies and depends on the temperature, b) Varies and depends on the position in space, c) Is constant throughout the physical system. | | |
| Work placement | Not applicable | | |

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