GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | , PG_00059190 | | |
| Field of study | Environmental Engineering | | |
| Date of commencement of studies | October 2022 | Academic year of realisation of subject | 2024/2025 |
| Education level | first-cycle studies | Subject group | Obligatory subject group in the field of study |
| Mode of study | Part-time studies | Mode of delivery | at the university |
| Year of study | 3 | Language of instruction | Polish |
| Semester of study | 5 | ECTS credits | 3.0 |
| Learning profile | general academic profile | Assessment form | exam |
| Conducting unit | Faculty of Civil and Environmental Engineering | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Arkadiusz Ostojski | |
| | Teachers | dr inż. Arkadiusz Ostojski | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 25.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25 |

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 | 25 | 0.0 | 50.0 | 75 |

**Subject objectives**

The aim of the course is to provide knowledge about the current requirements for thermal protection of buildings, heating systems, and hot water preparation.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K6_W09] has ordered, theoretically founded knowledge in the field of water supply, sewage, heating, ventilation and air conditioning, and the principles of shaping the microclimate of rooms; knows legal regulations, standardization issues and recommendations for the design of water supply, sewage, heating and gas networks and installations | Distinguishes between the types of heating systems and domestic hot water preparation. He knows the current legal requirements for thermal protection of buildings and heating installations. | [SW1] Assessment of factual knowledge |
| [K6_W08] has elementary knowledge of construction: including building materials, their strength, construction mechanics and building physics, moisture migration in buildings, heat transfer through building partitions | The student must demonstrate basic knowledge of building physics. He knows the mechanism of heat transfer through building partitions and the current legal requirements for thermal protection of buildings. | [SW1] Assessment of factual knowledge |

**Subject contents**

Lecture: Basics of heat transfer (conduction, convection, radiation). Thermal conductivity of building materials. Calculation values of thermal conductivity. Heat transfer resistances. Thermal resistance of homogeneous and heterogeneous partitions. Air layer resistance. Thermal resistance of ventilated and unventilated air layers. Heat transfer coefficient. Calculation of the heat transfer coefficient of building partitions. Temperature distribution in the partition. Thermal bridges in the partitions. Heat losses to the ground. Air temperature design values. Heat losses through building partitions. Air infiltration. Heat losses on heating the ventilation air. Total design heat loss of the rooms and the design load on the entire building. Energy certificates for buildings. Types of low-temperature heating systems (gravity - pump, with a lower - upper separation, one - two - pipe, floor). Applied protection of open and closed heating installations. Regulation of heating systems. Ways of preparing domestic hot water.

**Prerequisites and co-requisites**

**Assessment methods and criteria**

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| Written exam | 60.0% | 100.0% |

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| Recommended reading | Basic literature | 1) Koczyk H. (red.): Ogrzewnictwo. Podstawy projektowania cieplnego i termomodernizacji budynków. Poznań: Wydawnictwo Politechniki Poznańskiej 2000 2) Krygier K., Klinke T., Sewerynik J.: Ogrzewnictwo, wentylacja i klimatyzacja. Warszawa: Wydawnictwa Szkolne i Pedagogiczne 1997. 3) Pieńkowski K., Krawczyk D., Tumel W.: Ogrzewnictwo. T. 1. Białystok: Rozprawy Naukowe nr 63, 1999. |
| | Supplementary literature | 1) Koczyk H. (red.): Ogrzewnictwo praktyczne. Projektowanie, montaż, eksploatacja. Poznań: Systherm Serwis 2005. |
| | eResources addresses | Adresy na platformie eNauczanie:<br>Ochrona cieplna budynków i ogrzewnictwo I rok ak. 24/25 studia niestacjonarne - Moodle ID: 42412<br>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=42412 |
| Example issues/ example questions/ tasks being completed | | |
| Work placement | Not applicable | |

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