



Subject card

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|---|---|--|--|-------------------------------------|--|------------|-----|
| Subject name and code | Residential ventilation and air conditioning systems, PG_00057350 | | | | | | |
| Field of study | Power Engineering | | | | | | |
| Date of commencement of studies | February 2024 | Academic year of realisation of subject | | | 2024/2025 | | |
| Education level | second-cycle studies | Subject group | | | Optional subject group Subject group related to scientific research in the field of study | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 1 | Language of instruction | | | Polish | | |
| Semester of study | 2 | ECTS credits | | | 3.0 | | |
| Learning profile | general academic profile | Assessment form | | | exam | | |
| Conducting unit | Department of Sanitary Engineering -> Faculty of Civil and Environmental Engineering | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Sylwia Fudala-Książek | | | | | |
| | Teachers | | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 15.0 | 0.0 | 15.0 | 0.0 | 60 |
| | 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 | 60 | | 7.0 | | 8.0 | 75 |
| Subject objectives | The aim of the course is to familiarise the student with basic knowledge of ventilation and air-conditioning and the shaping of the indoor environment, current legal regulations and standards relating to the subject, installation materials and criteria for their selection, design methodologies, methods and technologies for the execution of the installations in question, as well as related non-technical considerations. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K7_W02] has extended and deepened knowledge of physics, chemistry, thermodynamics, fluid mechanics, material science, necessary to understand and describe basic thermal and flow phenomena occurring in and around power equipment and systems, transmission networks and internal installations | | The student is able to make calculations within a set of ventilation and air-conditioning devices using, among others, the knowledge of thermodynamics, basic thermo-humidity phenomena. He/she is able to select equipment correctly on the basis of the acquired knowledge. | | [SW1] Assessment of factual knowledge | | |
| | [K7_U06] is able to apply basic and advanced knowledge of power equipment and transmission network and internal installations to the preliminary design of a modern power plant or part thereof | | The student lists and defines basic concepts in the field of optimising the operation of ventilation and air-conditioning systems. Moreover, he or she is familiar with methods and devices for the rational management of energy and resources in ventilation and air conditioning. The student designs a mechanical ventilation and air-conditioning installation in a selected building both by making manual calculations and in programmes dedicated to the industry. | | [SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools | | |

| Subject contents | <p>LECTURES: Ventilation airflow and its properties. Organisation of room air exchange, air distribution in ventilated rooms. Characteristics of ventilation and air conditioning systems. Air treatment. Air recirculation and heat recovery. Mechanical ventilation and air conditioning system components ducts, fittings and equipment. Ventilation and air conditioning units. Dimensioning of mechanical ventilation duct networks. Basics of acoustics. Legal regulations, standards, technical, construction and fire requirements.</p> <p>EXERCISES: Calculations related to the change of parameters of the humid air condition and practical use of the hx (Mollier) diagram. Calculation of external and internal heat and moisture gains. Methods for the determination of ventilation air volume flows. DESIGN: Design of a mechanical supply and extract ventilation system for a set of rooms in a building. Ventilation air balance. Application of the principles of ventilation air distribution and selection of supply and extract air diffusers. Duct dimensioning. Selection of fittings and equipment. Calculation of pressure drops. Guidelines for preparing project documentation.</p> | | | | | | | | | | | | | | |
|--|---|---|-------------------|-------------------------------|--------------|-------|-------|-----------------------|-------|-------|------------------|-------|-------|--|--|
| Prerequisites and co-requisites | <p>Knowledge of the basics of ventilation and air conditioning. Ability to draw in AutoCAD. Knowledge of subjects including: physics, thermodynamics, microbiology, chemistry, heating, ventilation and air conditioning.</p> | | | | | | | | | | | | | | |
| Assessment methods and criteria | <table border="1"> <thead> <tr> <th data-bbox="453 418 790 450">Subject passing criteria</th> <th data-bbox="794 418 1141 450">Passing threshold</th> <th data-bbox="1145 418 1492 450">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 456 790 488">project task</td> <td data-bbox="794 456 1141 488">60.0%</td> <td data-bbox="1145 456 1492 488">40.0%</td> </tr> <tr> <td data-bbox="453 495 790 526">calculation exercises</td> <td data-bbox="794 495 1141 526">60.0%</td> <td data-bbox="1145 495 1492 526">20.0%</td> </tr> <tr> <td data-bbox="453 533 790 555">final colloquium</td> <td data-bbox="794 533 1141 555">60.0%</td> <td data-bbox="1145 533 1492 555">40.0%</td> </tr> </tbody> </table> | Subject passing criteria | Passing threshold | Percentage of the final grade | project task | 60.0% | 40.0% | calculation exercises | 60.0% | 20.0% | final colloquium | 60.0% | 40.0% | | |
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| final colloquium | 60.0% | 40.0% | | | | | | | | | | | | | |
| Recommended reading | <p>Basic literature</p> | <p>1. Jaskólski M., Micewicz Z.: Wentylacja i klimatyzacja hal krytych pływalni. IPPU MASTA, Gdańsk, 2000. 2. Klinke T.: Wentylacja. Tablice do obliczeń strat ciśnienia. OWPW, Warszawa, 2007. 3. Pelech A.: Wentylacja i klimatyzacja. Podstawy. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2009. 4. Szymański W., Wolańczyk F.: Termodynamika powietrza wilgotnego. Przykłady i zadania, OWPRz, Rzeszów, 2008. 5. Przepisy prawne: http://isap.sejm.gov.pl/, normy związane z tematem, warunki techniczne COBRTI Instal. 6. Malicki M.: Wentylacja i klimatyzacja. PWN Warszawa 1980 5. Jones W.P.: Klimatyzacja. ARKADY. Warszawa 2001</p> | | | | | | | | | | | | | |
| | <p>Supplementary literature</p> | <p>1. Gutkowski K.M., Butrymowicz D.J.: Chłodnictwo i klimatyzacja, WNT, Warszawa, 2007. 2. Rosiński M.: Odzyskiwanie ciepła w wybranych technologiach inżynierii środowiska. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2008. 3. Recknagel, Sprenger i in., Poradnik. Ogrzewanie i klimatyzacja. EWF, Gdańsk, 2008. 4. Żarski K.: Termodynamika. Zagadnienia praktyczne w ogrzewnictwie i klimatyzacji. Ośrodek Informacji Technika instalacyjna w budownictwie, Warszawa, 2005. 5. Wytyczne producentów, karty katalogowe armatury i urządzeń</p> | | | | | | | | | | | | | |
| | <p>eResources addresses</p> | <p>Adresy na platformie eNauczanie:</p> | | | | | | | | | | | | | |
| Example issues/ example questions/ tasks being completed | <p>1. Determination of humid air parameters on a Mollier chart. 2. Determination of air distribution for specific rooms.</p> | | | | | | | | | | | | | | |
| Work placement | <p>Not applicable</p> | | | | | | | | | | | | | | |