GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Residential ventilation and air conditioning systems, PG_00064752 | | |
| Field of study | Power Engineering, Power Engineering | | |
| Date of commencement of studies | February 2027 | Academic year of realisation of subject | 2027/2028 |
| Education level | second-cycle studies | Subject group | Specialty subject group<br>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 | 4.0 |
| Learning profile | general academic profile | Assessment form | exam |
| Conducting unit | Department of Sanitary Engineering -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Sylwia Fudala-Książek | |
| | Teachers | | |

**Lesson types**

| 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 | 33.0 | 100 |

**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_U04] creatively designs or modifies, either entirely or at least in part, energy systems, machines and devices, transmission grids and internal installations, considering both technical and non-technical aspects, estimating costs and utilizing design techniques appropriate for tasks within the scope of Power Engineering | The student designs or modifies, in whole or at least in part, energy systems, machines and equipment, transmission networks or internal installations according to a given specification, taking into account technical and non-technical aspects. The student is able to carry out an economic analysis of the designed solutions, estimating costs and using design techniques appropriate to the tasks in power engineering. | [SU1] Assessment of task fulfilment<br>[SU5] Assessment of ability to present the results of task |
| [K7_W03] demonstrates structured and theory supported knowledge encompassing key issues in the field of Power Engineering, enabling design of energy systems, machines and devices, transmission grids and internal installations | The student possesses knowledge covering issues in the field of Power Engineering which enables him/her to design power engineering systems, machines and equipment, transmission networks and internal installations He/she is able to use tools supporting power engineering design. | [SW1] Assessment of factual knowledge<br>[SW3] Assessment of knowledge contained in written work and projects |

<table>
<tr><td>Subject contents</td><td>Course content – lecture<br><br>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.<br>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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>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.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>final colloquium</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>calculation exercises</td><td>60.0%</td><td>20.0%</td></tr>
<tr><td>project task</td><td>60.0%</td><td>40.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>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. Pełech 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</td></tr>
<tr><td>Supplementary literature</td><td>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. EWFE, 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</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Determination of humid air parameters on a Mollier chart.<br><br>2. Determination of air distribution for specific rooms.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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