

Code	VII.10
Course Title (English)	Heating, Ventilation and Air Conditioning
Course Title (Polish)	Ogrzewnictwo, wentylacja i klimatyzacja
Credits	5 ECTS

Language of instruction **English**

Programme Computer Modelling and Simulation, Intelligent Energy, Biotechnology for Environmental Protection, Business and Technology

Type of studies BSc studies

Unit running the programme Institute of Mechanics and Machine Design Fundamentals

Course coordinator and academic teachers **Michał Turski, PhD. Eng. (Lec., Tut.)**

Form of classes and number of hours

Semester	Lec.	Tut.	Lab.	Proj.	Sem.	Credit points
7	30	30	-	-	-	5

Learning outcomes The objectives of this course are: knowledge about conditions of thermal comfort in the building, knowledge about construction and exploitation of the HVAC installation and devices, ability to make energy balances for heating, ventilation and air-conditioning needs of systems.

Prerequisites Knowledge in the range of mathematics, physics, fluid mechanics, technical thermodynamics, building and the technical drawing, ability of solving problems in the environmental engineering with using of mathematical methods, ability of making an assessment of basis technical conditions of buildings, ability of technical drawing and ability of making the visualization of engineering works.

Course description

LECTURE

- W 1 – Basic information of hygiene associated with HVAC.
- W 2 – Meteorological-climatic basic concepts for HVAC systems.
- W 3 – Design thermal load of building.
- W 4 – Seasonal heat demand for heating.
- W 5 – Heat balance for purpose of determining stream of ventilation air.
- W 6 – Design cooling load of building.
- W 7 – Seasonal cooling demand for air conditioning.
- W 8 – Demand of thermal power and heat for domestic hot water systems.
- W 9 – Heating systems.

- W 10, 11 – Heating systems components.
- W 12 – Basics of air treatment technique.
- W 13 – Ventilation and air conditioning systems.
- W 14 – Components of ventilation and air conditioning systems.
- W 15 – Domestic hot water system and its components.

TUTORIALS

- C 1-3 – Calculation of design thermal load of building.
- C 4-5 – Calculation of seasonal heat demand for heating.
- C 6-8 – Calculation of stream of ventilation air.
- C 9-11 – Calculation of design cooling load of building.
- C 12-13 – Calculation of seasonal cooling demand.
- C 14 – Calculation of thermal power and heat for domestic hot water systems.
- C 15 – Final test.

LABORATORY

Not applicable

PROJECT

Not applicable

SEMINAR

Not applicable

Form of assessment Exam

- Basic reference materials*
1. Sugarman S. C.: “HVAC fundamentals”. The Fairmont Press, Inc., 2004.
 2. Gupton W.: “HVAC controls: operation & maintenance”. Marcel Dekker, 2001.
 3. Bearg D.W.: “Indoor air quality and HVAC systems”. CRC Press, 1993.
 4. Monger S.: “Testing and balancing HVAC air and water systems”. The Fairmont Press, Inc., 2000 .
 5. Levenhagen J. I.: “HVAC control system design diagrams”. McGraw-Hill Professional, 1998.

Other reference materials

For Polish-speaking students:

1. Koczyk H.: Ogrzewnictwo praktyczne. Wydanie II, Wydawnictwo Systherm Serwis, Poznań, 2009.
2. Nantka. M.: Ogrzewnictwo i Ciepłownictwo. Tom I, Wydanie II, Wydawnictwo Politechniki Śląskiej, Gliwice, 2010.
3. Nantka. M.: Ogrzewnictwo i Ciepłownictwo. Tom II, Wydanie II, Wydawnictwo Politechniki Śląskiej, Gliwice, 2010.
4. Pełech A.: Wentylacja i Klimatyzacja. Wydawnictwa Politechniki Wrocławskiej, Wydanie II, 2009.
5. Recknagel H., Sprenger R. i inni: Ogrzewnictwo, Klimatyzacja, Ciepła woda, Chłodziwo. Wydawnictwo OMNI SCALA – TECNOCLIMA, 2008 .

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Average student workload (teaching hours + individ.)	4 hours of teaching hours + 2 hours of individual work per week
Remarks:	
<i>Updated on:04.09.2014</i>	