



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Ventilation and Air-Conditioning

### Course

Field of study

Environmental Engineering Extramural First

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

### Number of hours

Lecture

24

Laboratory classes

Other (e.g. online)

Tutorials

10

Projects/seminars

10

### Number of credit points

6

### Lecturers

Responsible for the course/lecturer:

dr inż. Andrzej Odyjas

Responsible for the course/lecturer:

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### Prerequisites

Student which continuing this course has the knowledge from the previous course concerning ventilation and air-conditioning of the inner spaces. He is also able to solve the tasks of humid air thermodynamic treatment . He's able also to make the air volume equation and to design the simple ventilation systems.

### Course objective

The main aim of the course is to exceed the knowledge of ventilation a air-conditioning - especially the air-conditioning and the cooling systems .



### Course-related learning outcomes

#### Knowledge

Knowledge of solving the simple cases of air-conditioning and cooling topics.

Basis knowledge of the structure of ventilation and air-conditioning systems.

Basis knowledge of heat and mass transfer, thermodynamics and fluid mechanics of ventilation and air-conditioning systems.

Basic knowledge of methods for designing simple ventilation and air-conditioning systems.

#### Skills

The student is able to get information of simple ventilation and air-conditioning systems from literature and analyze them.

The student is able to exchange information in HVAC engineering society.

The student is able to use AutoCAD software for designing ventilation and air-conditioning systems.

The student is able to design the simple ventilation and air-conditioning systems.

#### Social competences

The student understand the impact of ventilation and air conditioning on human internal environment.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - exam of written test

Tutorials - written test of calculations

Projects - correctly making the project of the simple air-conditioning system.

### Programme content

Air conditioning cooling loads for the buildings.

Classification and characteristic of air conditioning systems, fan-coils, convectors, coolin beems, cooling ceilings, capilar mats, one and two stage cooling circuit, air conditioners, VRV and VRF systems.

Direct and indirect cooling metods, cooling water centrals, coolin water chillers, IPLV and ESEER cooficiences, free-cooling.

Basic equipment of freon cooling systems, cooling compressors, expantion valves, evaporators and condensers, sizing the freon pipelines.

### Teaching methods

Lectures: multimedia presentations with blackboard examples,



Tutorials: common solving the tasks of the ventilation and air-conditioning topics.

Project: multimedia presentations of the basic information which are necessary for the designing job.

## Bibliography

### Basic

1. Przydrożny S.: Wentylacja. Wydawnictwo Politechniki Wrocławskiej. Wrocław 1991
2. Recknagel H., Sprenger E., Schramek E.R.: Kompendium wiedzy: ogrzewnictwo, klimatyzacja, ciepła woda, chłodnictwo, Wydawnictwo Omni Scala, Wrocław 2008
3. Pełech A.: Wentylacja i klimatyzacja - podstawy. Oficyna Wydawnicza Politechniki Wrocławskiej. Wrocław 2008
4. Malicki M.: Wentylacja i klimatyzacja. PWN Warszawa 1980
5. Jones W.P.: Klimatyzacja. ARKADY. Warszawa 2001

### Additional

1. Gaziński B.: Technika klimatyzacyjna dla praktyków. Komfort cieplny, zasady obliczeń i urządzenia. Systherm Serwis. Poznań 2005
2. Baumgarth, Horner, Reeker: Poradnik Klimatyzacji. Tom 1: Podstawy. Wydanie 1 polskie na podstawie zmienionego i rozszerzonego wydania niemieckiego. Systherm, Poznań 2011

## Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,0
Classes requiring direct contact with the teacher	44	2,0
Student's own work (literature studies, preparation for tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	106	4,0

<sup>1</sup> delete or add other activities as appropriate