



## 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

3/5

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

5

### Lecturers

Responsible for the course/lecturer:

dr inż. Andrzej Odyjas

Responsible for the course/lecturer:

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Energy

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### Prerequisites

Student which begin this course has the knowledge of mathematic, physic, chemistry and biology which is a basis for microbiological and chemical pollution of the air. Has also the knowledge of thermodynamics, fluid mechanics, heat engineering for humid air and heat transfer.

### Course objective

The main aim of the course is to present and discuss general principles and method used in ventilation and air-conditioning, systems and strategies of ventilation and air-conditioning used in different situations.



### Course-related learning outcomes

#### Knowledge

Knowledge of solution for simple cases of ventilation and air-conditioning.

Basis knowledge 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 system.

#### 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 - written test of theory and h-x chart calculations.

Tutorials - written test of calculations

Projects - correctly making the project of the ventilation system.

### Programme content

Humid air, h-x chart, parameters of outdoor climate, parameters of indoor climate comfort and thermal comfort, quality and cleanliness of the air, air tightness of the buildings, calculation of the air volume for the ventilating.

Acoustic problems of the ventilation and air-conditioning systems, acoustic requirements, noise sources, acoustic dampers, calculating the required absorption.

Description and division of ventilation and air-conditioning systems, structures of natural, hybrid and mechanical ventilation systems, effectiveness and efficiency of ventilation.

Distribution of ventilating air systems, air ducts and equipment, air tightness of the ventilation systems, air diffusers, selection and dimensioning of the ventilation elements, hydraulic calculations, cleaning the air ducts.



Elements of air handling units and ventilating installation: fans, filters, heat exchangers, recuperators, rotary exchangers, weather grills, dampers, fire dampers. Thermodynamic air changes in air-handling units.

### 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. Przydróżny 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	125	5,0
Classes requiring direct contact with the teacher	44	2,0
Student's own work (literature studies, preparation for tutorials, preparation for tests, project preparation) <sup>1</sup>	81	3,0

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