



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Air Conditioning and Mechanical Ventilation Systems of Aircraft

Course

Field of study

Aerospace Engineering

Area of study (specialization)

Onboard systems and aircraft propulsion

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

polish

Requirements

elective

Number of hours

Lecture

30

Laboratory classes

30

Other (e.g. online)

Tutorials

Projects/seminars

30

Number of credit points

7

Lecturers

Responsible for the course/lecturer:

Prof. Tomasz Mróz

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Responsible for the course/lecturer:

Dr. Bartosz Radomski

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Prerequisites

The student starting the course has to have the basic knowledge related to thermodynamics, heat and mass exchange and fluid dynamics.

Course objective

The transfer of basic knowledge concerning the technology of air conditioning and mechanical ventilation of aircraft. The development of skills related to the design, construction and exploitation of air conditioning and mechanical ventilation systems in aircrafts.

Course-related learning outcomes

Knowledge

1. The student has detailed knowledge concerning air conditioning and mechanical ventilation systems of aircrafts (system structure, sizing of components, optimization of operating parameters).



2. The student has knowledge related to the principles of design of air conditioning and mechanical ventilation systems in aircraft.
3. The student has knowledge related to the principles of exploitation of air conditioning and mechanical ventilation systems of aircraft.

Skills

1. The student is able to design air conditioning and mechanical ventilation system of aircraft and to select its components.
2. The student is able to evaluate and optimize the operating parameters of air conditioning and mechanical ventilation systems of aircraft.

Social competences

1. The student understands that air conditioning and mechanical ventilation systems of aircraft influence the health and comfort of passengers and crew and have the significant impact on environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge achieved during lectures is verified on the basis of one 60-minutes colloquium performed during the last lecture. Colloquium consists of 10 to 15 questions (test or open form). In order to pass the colloquium the student has to reach at least 50% of points.

The skills developed during laboratories are verified on the basis of output colloquiums performed during each laboratory and on the basis of reports delivered by the student after each laboratory test. In order to pass the course the student has to reach at least 50% of points.

The skills developed during projects are verified on the basis of the design report delivered by the student and its oral presentation.

Programme content

Indoor air quality, thermal comfort, the energy balance of human body. Calculation of amount of fresh air. Cooling and heating demands of aircrafts. The principles of sizing the air conditioning and mechanical ventilation systems of aircraft. The overview of air conditioning and mechanical ventilation systems of aircrafts. The principles of sizing of air conditioning and mechanical ventilation systems of aircraft. The principles of proper exploitation of air conditioning and mechanical ventilation systems of aircraft. Optimization of energy performance of air conditioning and mechanical ventilation systems of aircraft.

Teaching methods

Lecture: multi-media presentation supported by case study calculations presented on the blackboard.

Laboratory: multi-media presentation supported by the calculations performed on the blackboard. Performing the laboratory tests prepared by the lecturer.



Project: multi-media presentation supported by case study calculations presented on the blackboard.

Bibliography

Basic

1. De Remer D.: Aircraft Systems for Pilots, Aviation Supplies and Academics, Inc. (01/30/2018).
2. Jones W.P.: Klimatyzacja, Wydawnictwo Arkady, 1981.
3. Malicki .: Wentylacja i Klimatyzacja, PWN, 1974.
4. Mróz T.M.: Energy Management in Built Environment. Tools and Evaluation Procedures, Wydawnictwo Politechniki Poznańskiej, 2013.
5. Pełech A., Szcześniak S.: Wentylacja i Klimatyzacja. Zadania z Rozwiązaniami i Komentarzami, Wydawnictwo Politechniki Wrocławskiej, 2012.

Additional

Maczek K., i in.: Uzdatnianie Powietrza w Inżynierii Środowiska dla Celów Wentylacji i Klimatyzacji.

Wydawnictwo Politechniki Krakowskiej, 2010.

Breakdown of average student's workload

	Hours	ECTS
Total workload	171	7,0
Classes requiring direct contact with the teacher	96	4,0
Student's own work (literature studies, making presentations) ¹	75	3,0

¹ delete or add other activities as appropriate