COURSE DESCRIPTION CARD - SYLLABUS

Course name
Ecological aspects of air transport I

Course

Field of study
Aerospace Engineering

Year/Semester
3/5

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
60	30	0
Tutorials	**Projects/seminars**	
30	0	

Number of credit points

9

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:

Prerequisites

Basic knowledge in the field of: fuel combustion, airport operation, chemical composition of the atmosphere and exhaust gases, processes related to climate change, air pollution and its counteraction, construction of aircraft engines, operation of drives.

Course objective

Acquainting the student with the effects of air transport activities in terms of climate change and air pollution.

Course-related learning outcomes

Knowledge

1. has extended knowledge necessary to understand the profile subjects and specialist knowledge about

the construction, operation, air traffic management, safety systems, impact on the economy, society and the environment in the field of aviation and aerospace - [K2A_W01]

2. Has extended knowledge necessary to understand profile subjects and specialist knowledge of the construction, construction and manufacturing methods, of aircraft - [K2A_W04]

3. Has an ordered, theoretically founded general knowledge covering key issues in the field of the impact of aviation on the natural environment, emission of toxic compounds in aviation propulsion, acoustic emission of flying objects - [K2A_W08]

Skills

1. Can communicate using various techniques in the professional and other environments, using the formal notation of the structure, technical drawing, concepts and definitions of the scope of the studied field of study - [K2A_U02]

2. Has the ability to self-educate with the use of modern didactic tools, such as remote lectures, websites and databases, didactic programs, e-books - [K2A_U03]

3. Can obtain information from literature, the Internet, databases and other sources. Is able to integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions - [K2A_U04]

4. Can use formulas and tables, technical and economic calculations using a spreadsheet, specialized software - [K2A_U05]

5. The student knows how to use the theoretical probability distributions. The student is able to analyze and interpret statistical data. The student is able to use the methods and tools of mathematical statistics in engineering practice - K2A_U21]

Social competences

1. Understands the need for lifelong learning; can inspire and organize the learning process of other people - [K2A_K01]

2. Is ready to critically evaluate the knowledge and content received, recognize the importance of knowledge in solving cognitive and practical problems and consult experts in the event of difficulties with solving the problem on their own - [K2A_K02]

3. Is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment, and the related responsibility for decisions made - [K2A_K03]

4. Can cooperate and work in a group, taking different roles in it - [K2A_K04]

5. Is aware of the social role of a technical university graduate, and especially understands the need to formulate and convey to the society, in particular through the mass media, information and opinions on technological achievements and other aspects of engineering activities; makes efforts to provide such information and opinions in a generally understandable manner - [K2A_K08]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

LECTURE: Assessment of knowledge and skills on the written or oral test based on the explanation of selected issues

EXERCISES: Assessment of knowledge and skills on the written test on the basis of solved tasks

LABORATORY: Assessment of knowledge and skills on the basis of reports from classes prepared by the student

Programme content

LECTURE

Discussion of the importance of issues related to the impact of aviation on the environment, basic information in the field of acoustics. Noise sources in aviation. Noise reduction methods in aviation (construction of aircraft, aircraft engines and management). Exhaust emissions from aircraft engines (formation of harmful exhaust compounds, methodology for measuring pollutant emissions from aircraft engines, measuring equipment for measuring emissions, research programs). Possibilities of reducing exhaust emissions from aircraft. Conventional and alternative aviation fuels). Overview of alternative aircraft propulsion

EXERCISES:

Classes provide an example of solving the task on the blackboard (from the scope presented in the lecture) along with the analysis of subsequent stages. The way the students solve the problem on the blackboard is reviewed by the tutor.

LAB:

Practical classes using the combustion engine laboratory. Measurements of the concentration of toxic exhaust gases, certification procedures for aircraft engines, the impact of biofuels on the emission of toxic compounds, analysis of the emission of solid particles, acoustic tests.

Teaching methods

Informative (conventional) lecture (providing information in a structured way) - may be of a course (introductory) or monographic (specialist) character

The exercise method (subject exercises, practice exercises) - in the form of auditorium exercises (application of acquired knowledge in practice - may take various forms: solving cognitive tasks or training psychomotor skills; transforming a conscious activity into a habit through repetition)

Laboratory (experiment) method (students independently conduct experiments)

Bibliography

Basic

1. Paweł Głowacki, Stefan Szczeciński: Transport lotniczy : zagrożenia ekologiczne oraz sposoby ich ograniczania, Wydawnictwa Naukowe Instytutu Lotnictwa, 2013.

2. Włodzimierz Balicki, Ryszard Chachurski, Paweł Głowacki, Jan Godzimski, Krzysztof Kawalec, Adam Kozakiewicz, Zbigniew Pągowski, Artur Rowiński, Jerzy Szczeciński, Stefan Szczeciński: Lotnicze silniki turbinowe : konstrukcja - eksploatacja - diagnostyka. Cz. 1, Wydawnictwa Naukowe Instytutu Lotnictwa, 2010

3. Jerzy Merkisz: Ekologiczne problemy silników spalinowych, Wyd. Politechniki Poznańskiej, Poznań 1998.

Additional

1. Sumeer Charkuj, Piotr Kozłowski, Michał Nędza: Podstawy transportu lotniczego, Konsorcjum Akademickie Kraków–Rzeszów–Zamość 2012

2. Podręczniki szkoleniowe EASA ATPL Series

Breakdown of average student's workload

	Hours	ECTS
Total workload	225	9,0
Classes requiring direct contact with the teacher	150	6,0
Student's own work (literature studies, preparation for tutorials, preparation for exam) [1]	75	3,0

[1] delete or add other activities as appropriate