



COURSE DESCRIPTION CARD - SYLLABUS

Course name

The impact of aviation on the environment [S2LiK1>WLnŚ]

Course

Field of study

Aerospace Engineering

Year/Semester

1/1

Area of study (specialization)

Unmanned Aerial Vehicles

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Knowledge: The student has a basic knowledge of air transport. Skills: The student is able to associate and integrate the obtained information, analyze the phenomena occurring in the environment, draw conclusions, formulate and justify opinions. Social competences: The student is able to independently search for information in the literature and knows the rules of discussion; ability to formulate a research problem and search for its solution, independence in problem-solving, ability to cooperate in a group

Course objective

The aim of the course is to familiarize students with the impact of aviation on the environment, to present principles and methods for assessing the negative impact of air transport on the environment. After completing the course, students should also be familiar with the methods of reducing negative environmental impacts by air transport

Course-related learning outcomes

Knowledge:

1. has extended knowledge necessary to understand the profile subjects and specialist knowledge about the construction, methods of construction, production, operation, air traffic management, safety

systems, impact on the economy, society and the environment in the field of aviation and cosmonautics for selected specialties: Civil Aviation, Unnamed Aerial Vehicle [P7S_WG, P7S_WK, K2A_W01]
2. has an orderly, theoretically founded general knowledge covering key issues in the field of the impact of aviation on the natural environment, emission of toxic compounds from aircraft propulsion, acoustic emission of flying objects [P7S_WG, K2A_W08]

Skills:

1. is able to communicate using various techniques in the professional environment and other environments using the formal notation of construction, technical drawing, concepts and definitions of the scope of the study field [P7S_UK, K2A_U02]
2. has the ability to self-educate with the use of modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books [P7S_UW, P7S_UU, K2A_U03]
3. can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions [P7S_UW, P7S_UU, K2A_U04]

Social competences:

1. understands the need for lifelong learning; can inspire and organize the learning process of other people [P7S_UU, 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 case of difficulties in solving the problem on its own [P7S_KK, 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 [P7S_KR, K2A_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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The knowledge and skills of the lecture will be tested in the form of a written or oral exam. Classes will be assessed on the basis of a written test, while the laboratory grade will consist of partial grades from reports and tickets.

Programme content

1. Discussion of the importance of issues related to the impact of aviation on the environment, basic knowledge in the field of acoustics
2. Noise sources in aviation
3. Methods of reducing noise in aviation (aircraft construction, aircraft engines and management)
4. Exhaust emissions from aircraft engines (formation of harmful exhaust compounds, methodology for measuring pollutant emissions from aircraft engines, measuring apparatus for measuring emissions, research programs)
5. Possibilities of reducing emissions from aircraft
6. Aviation fuels (conventional and alternative)
7. Discussion of alternative propulsion of aircraft

Course topics

The classes discuss the impact of air transport on the environment. The directions of development of aircraft and their propulsion systems are also discussed in order to minimize the negative impact of aviation on the environment.

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 the 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 method

Bibliography

Basic

1. Paweł Głowacki, Stefan Szczeciński: Air transport: ecological threats and ways to reduce them, Scientific Publishers of the Institute of Aviation, 2013.
2. Włodzimierz Balicki, Ryszard Chachurski, Paweł Głowacki, Jan Godzimski, Krzysztof Kawalec, Adam Kozakiewicz, Zbigniew Pągowski, Artur Rowiński, Jerzy Szczeciński, Stefan Szczeciński: Aircraft turbine engines: construction - operation - diagnostics. Th. 1, Scientific Publishers of the Institute of Aviation, 2010
2. Jerzy Merkisz: Ecological problems of internal combustion engines, Wyd. Poznań University of Technology, Poznań 1998.

Additional

Sumeer Charkuj, Piotr Kozłowski, Michał Nędza: Podstawy transportu lotniczego, Konsorcjum Akademickie Kraków–Rzeszów–Zamość 2012
Podręczniki szkoleniowe EASA ATPL Series

Breakdown of average student's workload

	Hours	ECTS
Total workload	85	3,00
Classes requiring direct contact with the teacher	55	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00