



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Ecological aspects of aviation [S1Lot1-BTL>EATL]

Course

Field of study

Aviation

Year/Semester

3/5

Area of study (specialization)

Air Transport Safety

Profile of study

general academic

Level of study

first-cycle

Course offered in

polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

30

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

Number of credit points

5,00

Coordinators

dr hab. inż. Remigiusz Jasiński
remigiusz.jasinski@put.poznan.pl

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.

Course-related learning outcomes

Knowledge:

1. Has basic knowledge of environmental protection in transport, is aware of the risks associated with environmental protection and understands the specificity of the impact of mainly air transport on the environment as well as social, economic, legal and other non-technical conditions of engineering activities

2. Has basic knowledge of aviation law, organizations operating in civil aviation and knows the basic principles of state aviation functioning, has basic knowledge of key issues in the functioning of civil aviation

Skills:

1. Is able to obtain information from various sources, including literature and databases, both in Polish and in English, integrate them properly, interpret them and make a critical evaluation, draw conclusions and exhaustively justify the opinions they formulate
2. Is able to properly use information and communication techniques, applicable at various stages of the implementation of aviation projects
3. Is able to properly plan and perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions from them
4. Is able to design elements of means of transport with the use of data on environmental protection
5. Student is able to make a comprehensive assessment of the ecological parameters of an aircraft propulsion unit based on the values of emission factors for harmful gaseous compounds and particulate matter

Social competences:

1. Understands that in technology, knowledge and skills very quickly become obsolete

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 exam at the end of semester. 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. Lecture

Influence of air-fuel mixture on the emission of toxic compounds, operation of a jet engine in the LTO test, mechanisms of solid particles formation, secondary solid particles, use of aviation biofuels, aviation electrification.

2. Exercises

- fuel consumption in the LTO test
- emission of harmful compounds in the LTO test
- PM parameterization (mass)
- PM parameterization (number)
- the impact of the use of biofuels on the emission of toxic compounds and fuel consumption

3. Laboratories

Experimental engine research in various aviation scenarios.

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: 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 Nęcza: 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 | 125 | 5,00 |
| Classes requiring direct contact with the teacher | 77 | 3,00 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 48 | 2,00 |