COURSE DESCRIPTION CARD - SYLLABUS

Course name
Environmental protection [S1Lot2-PSPL>OŚ]

Course

Field of study
Aviation

Year/Semester
2/3

Area of study (specialization)
Aircraft Piloting

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
0

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

A student entering the study should have a basic knowledge of chemistry, physics, math, natural sciences, and knowledge of the impact of transportation on the surrounding environment. He should also have the ability to solve simple problems using publicly available databases such as scientific articles, legal acts or the Internet.

Course objective

To provide students with knowledge of the basics of environmental protection in air transport and related industries using fuel combustion processes.

Course-related learning outcomes

Knowledge:
1. the student has knowledge of aviation safety and management. The student knows the concept of the human factor and the methods of assessing human reliability
2. has the ability to self-study with the use of modern teaching tools, such as remote lectures, internet websites
and databases, teaching programs, e-books

Skills:
1. can obtain information from various sources, including literature and databases, both in Polish and in English, integrate them properly, interpret and critically evaluate them, draw conclusions and exhaustively justify their opinions
2 is able to properly use information and communication techniques, applicable at various stages of the implementation of aviation projects
3 can see legal aspects in the process of formulating and solving tasks in air transport, in particular, use the aspects of European and national aviation law regulations
4. can assess - at least in a basic scope - various aspects of the risk associated with a logistics undertaking in
air transport
Social competence
1. can think and act in an entrepreneurial way, incl. finding commercial applications for the created system, taking into account not only the business benefits, but also the social benefits of the conducted activity
2. is aware of the social role of a graduate of a technical university, in particular understands the need to formulate and convey to the society, in an appropriate form, information and opinions on engineering activities, technological achievements, as well as the achievements and traditions of the engineer profession
3. correctly identifies and resolves dilemmas related to the profession of an aerospace engineer

Social competences:
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Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Laboratory:
verification of preparation (knowledge) for laboratory classes, bonus of practical knowledge acquired during previous laboratory exercises,
evaluation of knowledge and skills related to the performance of measurements and their elaboration in the form of reports,
Credit colloquium consisting of 5-7 tasks variously scored

Programme content

Laboratories:
1) measurement methods used in air protection
2) methodology for calculating emissions of toxic compounds
3) evaluation of the impact of operating parameters on the emission of toxic compounds (CO, NOx, dust) during the combustion of fossil fuels in combustion chambers,
4) evaluation of primary methods during the formation of nitrogen oxides
5) evaluation of noise propagation from machinery
6) method of calculating noise propagation,

Course topics

1) construction of measurement systems used to evaluate combustion processes
2) study of the influence of the excess air ratio on the formation of NO and CO
3) evaluation of the influence of operational parameters on the formation of toxic compounds in engine combustion chambers
4) influence of the chemical composition of fuel on the formation of toxic compounds
5) evaluation of noise generated by power machinery, compressor or turbine
6) measurement of noise propagation through the aircraft
7) analysis of the impact of CM3 engine operation on the environment

Teaching methods

none

Bibliography

Basic:
1. Józef Jarosiński: Techniki czystego spalania
2. Jerzy Merkisz, Ireneusz. Pielecha: Alternatywne paliwa i układy napędowe
3. Molenda J. Steczko K. Ochrona środowiska w gazownictwie i użytkowaniu gazu
4.Warych Jerzy: Oczyszczanie przemysłowych gazów odlotowych
Uzupełniająca
1. John C. Mycock: Handbook of air pollution control engineering and technology
2. PEP2040 Politechnika Energetyczna Polski do 2040
3. Rozporządzenia krajowe i europejskie dotyczące ochrony środowiska w transporcie i energetyce

Additional:
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Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,50