POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Sustainable development of aviation [S2LiK2P>ZRL]

Course

Field of study	Year/Semester
Aerospace Engineering	1/1
Area of study (specialization)	Profile of study
–	practical
Level of study	Course offered in
second-cycle	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other
15	15	0

Tutorials	Projects/seminars
15	0

Number of credit points

3,00

Coordinators	Lecturers
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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
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
3. has basic knowledge of law, in particular civil aviation law

Skills:
1. has the ability to self-educate with the use of modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books
2. is able to apply basic technical standards concerning unification and safety and recycling
3. is able to communicate using various techniques in the professional environment and other environments using the formal notation of concepts and definitions of the scope of the study field
4. is able to interact and work in a group, assuming various roles in it
5. understands the need for lifelong learning; can inspire and organize the learning process of other people

Social competences:
1. 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
2. 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
3. has the competencies necessary to interact with other industry employees (including in English)

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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

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	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00