



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Environmental engineering in aviation

### Course

Field of study

Aerospace Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

Dr hab. inż. Rafał Ślefarski

Responsible for the course/lecturer:

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Wydział Inżynierii Środowiska i Energetyki

ul. Piotrowo 3 60-965 Poznań

### Prerequisites

A student starting this subject should have basic knowledge of chemistry, physics, mathematics, natural sciences and knowledge about transport impact on the surrounding environment. In addition student should be able to solve simple problems using publicly available databases such as scientific articles, legal acts or the Internet.

### Course objective

To acquaint students with the knowledge about basics of environmental protection in aviation industry and related industries using fuel combustion processes.

### Course-related learning outcomes

Knowledge



1. Has detailed knowledge related to selected issues related to the occurrence of phenomena occurring in the Earth's atmosphere and methods of limiting the negative impact of aviation activities on the surrounding environment
2. Has expanded knowledge necessary to understand the impact of design and operation of air transport on society and the environment
3. Has basic knowledge necessary to understand social, economic, legal and other non-technical determinants of aviation engineering activities

#### Skills

1. Student has the ability to self-study using modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books
2. Is able to integrate obtained information from various databases, interpret and draw conclusions about the impact of transport on the environment
3. Is able to use formulas and tables, technical and economic calculations using a spreadsheet and running a simple relational database in the aspect of parameters related to atmosphere protection

#### Social competences

1. Is aware of the importance of maintaining the principles of professional ethics
2. Understands the need for critical evaluation of existing knowledge and continuous learning
3. Is aware of the social role of a technical university graduate, and in particular understands the need to formulate and convey to the public information and opinions on technical achievements and other aspects of engineering activities, especially in the field of technologies related to environmental protection

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: the written examination, test 5-10 questions, 90 min, minimum for positive mark is 50%

Laboratory - final test and rewarding knowledge necessary for the accomplishment of the problems in the area of the subject, evaluation of student report,

#### Programme content

Introduction to fuel combustion processes, methods of reducing fuel consumption in aviation, analysis of the formation of toxic compounds during the combustion of fossil fuels used in aviation, carbon dioxide balance in the atmosphere, photovoltaic smog, alternative fuels, noise and prevention methods, EU energy policy and environmental protection, international protocols related to environmental protection,

#### Teaching methods



Lecture: multimedia presentation, illustrated with examples on the board

Laboratory exercises: practical exercises carried out in research test rig

### Bibliography

Basic

1. Józef Jarosiński: Techniki czystego spalania
2. Molenda J. Steczko K. Ochrona środowiska w gazownictwie i użytkowaniu gazu
3. Jerzy Merkisz, Ireneusz. Pielecha: Alternatywne paliwa i układy napędowe
4. Warych Jerzy: Oczyszczanie przemysłowych gazów odlotowych

Additional

1. John C. Mycock: Handbook of air pollution control engineering and technology
2. PEP2040 Energy Policy of Poland to 2040
3. EU and domestic acts and standards for environmental protection in transportation and energy

### Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	34	1,5
Student's own work (literature studies, preparation for laboratory classes, consolidation of the content of classes, preparation for tests,) <sup>1</sup>	16	0,5

<sup>1</sup> delete or add other activities as appropriate