



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Means of transport operation [S1Lot2-BSP>EŚT]

Course

Field of study

Aviation

Year/Semester

2/4

Area of study (specialization)

Unmanned Aerial Vehicles

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

30

Laboratory classes

15

Other

0

Tutorials

15

Projects/seminars

0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Knowledge: Basic knowledge of physics, construction and principles of air transport operation. Skills: Is able to analyze the interdependencies between the effects and causes of phenomena and events resulting from the laws of physics. Has basic soft skills. Social competences: Prepared for teamwork.

Course objective

The aim of the course is to familiarize students with the issues related to the exploitation of air transport means. Acquainting with the formulation and solving of problems related to the operation of means of transport, in particular with the aspects of aircrafts using and servicing (maintenance).

Course-related learning outcomes

Knowledge:

1. Has ordered, theoretically founded general knowledge of technology and various means of air transport, about the life cycle of means of transport, both hardware and software, and in particular about the key processes taking place in them.
2. Has ordered and theoretically founded general knowledge in the field of key technical issues and detailed knowledge of selected issues related to air transport, knows the basic techniques, methods and

tools used in the process of solving tasks related to air transport, mainly of an engineering nature.

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. Can properly plan and perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions from them.
3. Can analyze objects and technical solutions, can search in catalogs and on manufacturers' websites ready components of machines and devices, including means and devices, assess their suitability for use in own technical and organizational projects.
4. Is able to formulate and solve tasks related to civil aviation, apply appropriately selected methods, including analytical, simulation or experimental methods.

Social competences:

1. Understands that in technology, knowledge and skills very quickly become obsolete.
2. Is aware of the importance of knowledge in solving engineering problems, knows examples and understands the causes of malfunctioning engineering projects that have led to serious financial and social losses, or to a serious loss of health and even life.
3. Is aware of the social role of a technical university graduate, 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.
4. Correctly identifies and resolves dilemmas related to the profession of aerospace engineer.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

To pass the lecture, Student should receive at least 51% of positive answers by completing a final test. Additionally, activities during lectures, such as substantive discussion and ongoing preparation for classes, are rewarded. Completion of other lecture forms based on the final test and reports on work during each exercise.

Programme content

Operation of technical objects
Operational properties and characteristics of airplanes and helicopters
Machine operation engineering
Fundamentals of aircraft operation
Decision-making problems in the operation of means of transport

Course topics

1. Basic information and definitions concerning the technical operation of transport vehicles.
2. Aircrafts attributes and properties.
3. Reliability and unreliability of aircrafts. Reliability indicators and structures in operation.
4. Aircrafts malfunctions and damages.
5. Aircrafts readiness.
6. Aircrafts suitability.
7. Durability and viability of aircrafts.
8. Aircrafts diagnostic susceptibility.
9. Basic diagnostics of aircraft drive systems.
10. Costs in the operation of transport means.
11. Supply chains and storage in operation.

Teaching methods

1. Lectures - multimedia presentation with a discussion
2. Tutorials - tasks solving, case study and teamwork
3. Laboratory classes - implementation of experimental tasks of a practical nature regarding methods of operating transport means, work in groups. Laboratory exercises carried out as part of an educational trip

to military units of the General Command of the Armed Forces

Bibliography

Basic:

1. Lewitowicz J., Eksploatacyjne własności i właściwości samolotów i śmigłowców, ITWL, Warsaw 2015.
2. Niziński St., Eksploatacja obiektów technicznych, Radom 2002.
3. Słowiński B., Inżynieria eksploatacji maszyn, 2010.
4. Karpiński T., Inżynieria produkcji, WNT, Warsaw 2004.

Additional:

1. Lewitowicz J. i inni; Podstawy eksploatacji statków powietrznych, vol. 1-6, ITWL, 2001-2012.
2. Będkowski L., Dąbrowski T., Podstawy eksploatacji, vol. 1, WAT, Warsaw 2000.
3. Augustyn E., Zarządzanie ryzykiem zagrożeń w systemie użytkowania samolotów lotnictwa taktycznego sił powietrznych, PhD thesis, Poznan 2019.
4. Danilecki S., Tkaczuk S., Eksploatowanie samolotów jako dyscyplina wiedzy po 100 latach doświadczeń, WAT, vol. LXIV, No. 4, 2015.
5. Pyza D., Gołda P., Problemy decyzyjne w eksploatacji środków transportu, Scientific works of the Warsaw University of Technology, Transport vol. 119, 2017.
6. Szymański G. M., Misztal W., Orczyk M., Komorski P., Modeling of the octave sound spectrum emitted by the F-16 Block 52+ aircraft during takeoff, Measurement, 170/2021.
7. Szymański G. M., Misztal A., Misztal W., Zastosowanie krótkoczasowej analizy częstotliwościowej do wyznaczenia częstotliwości wymuszeń odrzutowego silnika lotniczego na stanowisku badawczym, Buses: Operation and testing, vol. 12/2017.
8. Misztal A., Szymański G. M., Misztal W., Komorski P., Innovative application of quality methods in the homogeneity assessment of the F-16 aircraft group in terms of generated noise, Eksploatacja i Niezawodność - Maintenance and Reliability - 2022, vol. 24, no. 2, s. 187-199.

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50