COURSE DESCRIPTION CARD - SYLLABUS

Course name

Aircraft propulsions systems

Course

Field of study

Aerospace Engineering

Year/Semester

3/5

Area of study (specialization)

Aircraft Transport

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

30

Laboratory classes

30

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

6

Lecturers

Responsible for the course/lecturer:

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Civil and Transport Engineering

ul. Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Knowledge: Basic knowledge of physics, mechanics, fluid mechanics, thermodynamics

Skills: Ability to think analytically, carry out cause-and-effect analysis

Social competencies: Can work in a group, present own thoughts and assessments supported by justification

Course objective

Introduced to the types and construction of aircraft propulsors, and the consequences of their use. Overview of contemporary aircraft propulsion designs.

Course-related learning outcomes

Knowledge

1. has ordered, theoretically founded general knowledge covering key issues in the field of technical thermodynamics, i.e. the theory of thermodynamic transformations, heat flow, thermal and cooling machines - [[T1A_W03]]

2. has detailed knowledge related to selected issues in the field of building air propulsion systems and designing their subassemblies - - [[T1A_W03]]

3. has a basic knowledge of the life cycle of devices, objects and technical systems, as well as the methods of their technical description - [[T1A_W06]]

Skills

1. knows how to use native and international languages to the extent that it allows to understand technical texts and write technical descriptions of machines in the field of aviation and astronautics (technical terminology) - [[T1A_U01]]

2. can obtain information from literature, the Internet, databases and other sources. Is able to integrate the obtained information, interpret and draw conclusions from them and create and justify opinions - [[T1A_U01]]

3. can prepare and present a short verbal and multimedia presentation devoted to the results of an engineering task - [[T1A_U04]]

4. is able to carry out elementary technical calculations in the field of fluid mechanics, and thermodynamics, such as thermal and mass balances, pressure losses in flows around technical flying objects and their modules, choose the parameters of fans, compressors and turbines for flow systems, and calculate thermodynamic waveforms in thermal machines - [[T1A_U09]]

5. can draw a schematic and a simple machine element in accordance with the principles of technical drawing - [[T1A_U14]]

Social competences

1. understands the need to learn throughout life; can inspire and organize the learning process of other people - [[T1A_K01]]

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 - [[T1A_K02]]

3. is able to properly determine the priorities for the implementation of the task set by himself or others - [[T1A _K04]]

4. is aware of the social role of a technical university graduate, and especially understands the need to formulate and communicate to the public, in particular through mass media, information and opinions

on the achievements of technology and other aspects of engineering activities; makes efforts to provide such information and opinions in a widely understood way - [[T1A _K07]]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Exam from lecture and pass from laboratories

Programme content

History of aircraft propulsion development.

Theoretical foundations of drive operation and thrust force generation.

Classification of aviation propulsion systems, comparison of propulsion systems types.

The concept of a jet engine thrust, engine performance indicators.

Flow theory of propeller, enclosed propeller, gas stream theory.

Characteristics of propeller and jet propulsors.

Selection of the engine for the aircraft.

An overview of the design of modern aircraft propulsors and prospects for their development

Teaching methods

Informative (conventional) lecture (transfer of information in a systematic way) - can be of course (propedeutical) or monographic (specialist)

Laboratory (experiment) method (students conduct experiments independently)

Bibliography

Basic

1. Piotr Strzelczyk. Wybrane zagadnienia aerodynamiki śmigieł. Oficyna Wydawnicza Politechniki Rzeszowskiej. Rzeszów 2008.

2. W. Cheda, M. Malski Techniczny poradnik lotniczy. Silniki. WKiŁ, Warszawa 1984

3. The Jet Engines. Wyd. Rolls Royce 1986 r.

4. Dzierżanowski P., Kordziński W., Otyś J., Łyżwiński M., Szczeciński S., WiatrekR.: Napędy Lotnicze. Turbinowe silniki odrzutowe. WKŁ, Warszawa 1983.

5. Dzierżanowski P., Kordziński W., Otyś J., Szczeciński S., WiatrekR.: Napędy Lotnicze. Turbinowe silniki śmigłowe i śmigłowcowe. WKŁ, Warszawa 1985.

Additional

1. Kotlarz W.: Turbinowe zespoły napędowe źródłem skażeń powietrza na lotniskach wojskowych. (Turbine Driving Systems as Pollution Sources at Military Airports), Air Forces Academy, Dęblin 2004

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,0
Classes requiring direct contact with the teacher	60	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	90	4,0

[1] delete or add other activities as appropriate