COURSE DESCRIPTION CARD - SYLLABUS

Course name

Construction of jet units

Course

Field of study	Year/Semester
Aerospace Engineering	2/4
Area of study (specialization)	Profile of study
Aircraft engines and airframes	general academic
Level of study	Course offered in
First-cycle studies	polish
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	-0
Tutorials	Projects/seminars	
15	-0	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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Prerequisites

Basic knowledge of technical drawing, mechanics, strength of materials and thermodynamics.

Course objective

To familiarize students with issues related to the requirements, construction and operation of aircraft assemblies for turbine engines and examples of control systems implementation.

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, heat machines, materials science, construction of flow machines and the ability to make technical drawings.

2. has ordered, theoretically founded general knowledge covering key issues in the field of on-board systems, as well as on-board and ground-based electronic communication systems, in particular radiolacation systems and design solutions.

3. has a basic knowledge of the basic processes occurring in the life cycle of devices, objects and technical systems, as well as their technical description in the field of aviation engineering, in particular flow machinery, gas turbines and their exploitation

Skills

1. knows how to use a language to the extent that it is possible to understand technical texts in the field of aviation (knowledge of technical terminology), in particular by using technical vocabulary in the field of powerplant construction.

2. is able to obtain information from literature, the Internet, databases and other sources. Is able to integrate obtained information, interpret and draw conclusions from them, in particular obtain information on the construction of DTSO aircraft engines.

3. is able to carry out elementary technical calculations in the field of fluid mechanics and thermodynamics, such as heat and mass balances, pressure losses in flows around technical flying objects and their modules, select the parameters of fans, compressors and turbines for flow systems, as well as calculate thermodynamic waveforms in heat machines, with particular emphasis on TSO and DTSO engines with Joule-Brayton cycle

Social competences

1. Is aware of the importance of maintaining the principles of professional ethics

2. Understands the need for critical assessment of knowledge and continuous learning

3. can inspire and organize the learning process of others

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

written exam

final test

laboratory reports and test

Programme content

Turbine engines as a drive for aircraft engines. Requirements, construction and operational requirements for drive units and automatic turbine engine control systems. Examples of practical implementation of control systems of modern turbine engines. Operation of aircraft powered by turbine and piston engines according to standards specified in the requirements of EASA PART 66 aviation regulations

PART - 66 (THEORY - 15 hours, PRACTICE - 11.25 hours)

MODULE 16. PISTON ENGINE

16.4 Engine fuel systems

16.4.2 Fuel injection systems

Types, construction and principles of operation. [2]

Teaching methods

lecture, description, discussion, blackboard exercises, independent practical exercises, laboratories

Bibliography

Basic

1. Lotnicze silniki turbinowe : konstrukcja - eksploatacja - diagnostyka. Cz. 1Włodzimierz Balicki, Ryszard Chachurski, Paweł Głowacki, Jan Godzimski, Krzysztof Kawalec, Adam Kozakiewicz, Zbigniew Pągowski, Artur Rowiński, Jerzy Szczeciński, Stefan Szczeciński. , Wydawnictwa Naukowe Instytutu Lotnictwa. Wydawca, Wydawnictwa Naukowe Instytutu Lotnictwa, 2010

2. Lotnicze zespoły napędowe. Cz. 2 / Stefan Szczeciński, Włodzimierz Balicki, Ryszard Chachurski, Paweł Głowacki, Jan Godzimirski, Adam Kozakiewicz, Zbigniew Pągowski, Jerzy Szczeciński.Wydawnictwa Naukowe Instytutu Lotnictwa. Wydawca, Wydawnictwa Naukowe Instytutu Lotnictwa,

3.Lotnicze zespoły napędowe. Cz. 3 / Stefan Szczeciński, Włodzimierz Balicki, Ryszard Chachurski, Paweł Głowacki, Krzysztof Kawalec, Adam Kozakiewicz, Jerzy Szczeciński. Wydawnictwa Naukowe Instytutu Lotnictwa. Wydawca, Wydawnictwa Naukowe Instytutu Lotnictwa,

4. Eksploatacja silników turbinowych / Benedykt Boliński, Zdzisław Stelmaszczyk.Wydawnictwa Komunikacji i Łączności. Wydawca

5. Turbinowe silniki odrzutowe / Paweł Dzierżanowski, Walerian Kordziński, Mieczysław Łyżwiński, Jerzy Otyś, Stefan Szczeciński, Ryszard Wiaterek,Wydawnictwa Komunikacji i Łączności. Wydawca

Wydawnictwa Komunikacji i Łączności, 1983.

Additional

Rolls Royce.. The Jet Engine, Renault Printing Co Ltd, Birmingham 1986.

Boyce, Meherwan P.. Gas Turbine Engineering. Butterworth-Heinemann, Waltham, fourth edition, 2012.

Kiameh, Philip.. Power Generation Handbook. McGraw-Hill, New York, 2002.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	1,8
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	30	1,2

[1] delete or add other activities as appropriate