POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name

Aircraft engine tests and diagnostics

Course

Field of study	Year/Semester
Aerospace Engineering	
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	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Grzegorz Szymański prof. PP

email: grzegorz.m.szymanski@put.poznan.pl

tel. (061) 2244510

ul. Piotrowo 3; 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Basic knowledge of mechanics, metrology, material strength and machine construction. He can apply the scientific method in solving problems, carrying out experiments and inference. He knows the limits of his own knowledge and skills; can formulate questions precisely, understand the need for further education

Course objective

The aim of the course is to learn theoretical and practical issues related to research and diagnostics of aircraft engines, including: the scope of engine tests and methods of diagnosis, diagnostic modeling and forecasting future states of aircraft engines.

Course-related learning outcomes

Knowledge

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has a basic knowledge of measurement methods, characteristics of measuring instruments and their classification according to purpose, principles of operation and features, knows sensors and measuring transducers, registration of results, measurement systems, measurement errors - the influence of external factors, statistical analysis of measurement results, principles of organization of an active experiment and passive

has basic knowledge in the field of technical diagnostics as well as methods and methods of solving problems of technical condition assessment and forecasting, knows: conditions for diagnosing technical objects, the essence of technical diagnostics in aviation engineering, tasks and objectives of technical diagnostics

has basic knowledge of 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

Skills

is able to organize and plan the design and maintenance process of uncomplicated on-board equipment, aircraft engine testing and diagnosis machines

can obtain information on research and diagnostics of aircraft engines from literature, the Internet, databases and other sources. Is able to integrate obtained information, interpret and draw conclusions from them

is able to conduct a research experiment using measuring equipment, computer simulations, is able to perform measurements such as, for example, measurements of temperature, speed and flow rate, pressure and forces, vibrations and other diagnostic symptoms, and interpret the results and draw conclusions

Social competences

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

is able to properly set priorities for implementation of the task specified by himself or others based on available knowledge

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:

Knowledge acquired as part of the lecture is verified by a 45-minute test carried out on the 7th lecture. Colloquium consists of questions (test and open), variously scored. Passing threshold: 50% of points.

Skills acquired as part of the laboratory classes are verified on the basis of the final test, consisting of tasks scored differently depending on their level of difficulty. Passing threshold: 50% of points.

Programme content

Basic stages of engine testing. The role and scope of bench tests and during flight. Braking of aircraft engines and their capabilities. Technical measures in aircraft engine tests. Methods of bench tests and

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during flight of aircraft engines. Determination of operating parameters and characteristics of aircraft engines. Registration and processing of results from engine tests

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

MODULE 6. MATERIALS AND EQUIPMENT

6.4 Corrosion

a) Chemical basics;

Creation by electroplating process, microbiological, by pressure; [2]

MODULE 7A. MAINTENANCE ACTIVITIES

7.18 Disassembly, Inspection, Repair and Assembly Techniques

a) Damage types and visual inspection techniques;

Corrosion removal, evaluation and re-corrosion protection. [3]

b) General repair methods, structure repair manual;

Aging, fatigue and corrosion control programs. [2]

c) Techniques of non-destructive testing together with penetrant, radiographic and current methods

vortex, ultrasonic and borescope. [2]

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples given on the board.

2. Laboratory exercises: multimedia presentation illustrated with examples given on a blackboard and performance of tasks given by the teacher - practical exercises.

Bibliography

Basic

1. Bukowski J., Łucjanek W., Napęd śmigłowy. Teoria i konstrukcja, Wyd. MON, Warszawa 1986r

2. Mysłowski J., Doładowanie silników, Wyd. Komunikacji i Łączności, Warszawa 2006r

3. R.B. Randall: Vibration based condition monitoring, Wiley, 2011.

4. Niziński S. Michalski R.: Diagnostyka obiektów technicznych. Monograficzna seria wydawnicza Biblioteka Problemów Eksploatacji, Warszawa - Sulejówek - Olsztyn - Radom, 2002.

5. J. Marciniak: Diagnostyka techniczna kolejowych pojazdów szynowych. WKiŁ, Warszawa 1982.

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6. B. Żółtowski: Podstawy diagnostyki maszyn. Wydawnictwo. Uczelniane Akademii Techniczno-Rolniczej w Bydgoszczy, Bydgoszcz 1996.

7. C. Cempel, F. Tomaszewski: Diagnostyka Maszyn. Zasady ogólne, przykłady zastosowań. M.C.N.E.M.T, Radom 1992.

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	78	3,0
Classes requiring direct contact with the teacher	52	2,0
Student's own work (literature studies, preparation for laboratory classes, preparation for tests) [1]	26	1,0

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[1] delete or add other activities as appropriate