



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electric aircraft propulsion systems

### Course

Field of study

Aviation

Area of study (specialization)

Unmanned aerial vehicles

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/5

Profile of study

general academic

Course offered in

Polish

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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Wydział Automatyki, Robotyki i Elektrotechniki

Piotrowo 3a, 60-965 Poznań

Responsible for the course/lecturer:

### Prerequisites

Knowledge: Basic knowledge of mathematical analysis, electrical engineering, electronics and metrology.

Skills: He uses the laws of electrical engineering to analyze electric and electronic circuits of direct and alternating current. Have basic skills in the use of simulation software, as well as efficiently obtain additional information from various sources.

Social competence: understands the need to improve one's qualifications and is ready to work in a team.



### Course objective

Familiarizing the student with the issue of electric propulsion of aircraft (e.g. design features, operational features, disadvantages, advantages, application)

### Course-related learning outcomes

#### Knowledge

has detailed knowledge related to selected issues in the field of manned and unmanned aircraft construction, in the field of on-board equipment, control systems, communication and recording systems, automation of individual systems, has basic knowledge of flight simulation training devices and simulation methods used to solve air transport issues

has detailed knowledge related to selected issues in the field of construction of aircraft propulsion systems and the design of their components as well as their life cycles and principles of technical description

has basic knowledge of the generation and processing of signals in the form of currents, electric voltages and electromagnetic fields

#### Skills

is able to obtain information from various sources, including literature and databases, both in Polish and in English, integrate them properly, interpret them and make a critical evaluation, draw conclusions and exhaustively justify the opinions they formulate

is able to properly plan and perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions from them

is able to communicate using various techniques in the professional environment and other environments using the formal notation of construction, technical drawing, concepts and definitions of the scope of the study field of study

#### Social competences

is aware of the importance of knowledge in solving engineering problems and knows examples and understands the causes of faulty engineering projects that have led to serious financial and social losses, or to a serious loss of health and even life

is able to think and act in an entrepreneurial way, incl. finding commercial applications for the created system, bearing in mind not only the business benefits, but also the social benefits of the activity

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

#### Lecture

Assessment of knowledge and skills demonstrated in a written test of a test and accounting nature (the written test sheet contains information necessary to perform accounting tasks). Test passing threshold 50%. Rewarding grades from laboratory classes as well as attendance and activity during the lecture.



## Laboratory classes

Entrance tests and bonuses for the knowledge necessary to implement the problems set in the area of laboratory tasks. Evaluation of skills related to the implementation of the measurement task. Evaluation of reports on exercises performed during and after the classes. Evaluation of the knowledge demonstrated in the written test in the field of the content of laboratory classes (test questions and calculation tasks).

## Programme content

1. Requirements for aircraft propulsion systems.
2. Elements of the electric drive system.
3. Systematics and prospects for the development of electricity storage systems.
4. Designing the required features of the electric drive system.

## Teaching methods

Information lecture (conventional) (transmission of information in a systematic way) - can be of a course (propedeutic) or monographic (specialist) nature

Laboratory exercises in the form of practical tasks

## Bibliography

Basic

1. M. Kuźniar: Wielokryterialna ocena doboru napędów lotniczych nowej generacji z wykorzystaniem metod energetycznych. Rozprawa doktorska, Rzeszów 2020.

Additional

1. R. Jakubowski, T. Wołoszyn: Zastosowanie napędu elektrycznego w bezałogowych aparatach latających. Technika transportu szynowego 12/2015.

## Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,0
Classes requiring direct contact with the teacher	60	2,5
Student's own work (literature studies, preparation for classes, preparation for tests,) <sup>1</sup>	90	3,5

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