



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Introduction to autonomous systems

### Course

Field of study

Year/Semester

Aviation

1/1

Area of study (specialization)

Profile of study

-

general academic

Level of study

Course offered in

First-cycle studies

polish

Form of study

Requirements

full-time

compulsory

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

30

0

0

Tutorials

Projects/seminars

0

0

**Number of credit points**

2

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr inż. Krzysztof Walas

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Wydział Automatyki, Robotyki i Elektrotechniki

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### Prerequisites

Knowledge: Basic knowledge of mathematics, physics and computer science.

Skills: Is able to analyze the interdependencies between the effects and causes of phenomena and events resulting from the laws of physics.

Social competences: Prepared for teamwork.

### Course objective

Getting to know the basic components of autonomous systems.



### Course-related learning outcomes

#### Knowledge

has basic knowledge of aviation law, organizations operating in civil aviation and knows the basic principles of state aviation functioning, has basic knowledge of key issues in the functioning of civil aviation

knows the basic concepts of economics, relating in particular to air transport, has basic knowledge of managing and running a business and knows the general principles of creating and developing forms of individual entrepreneurship, especially in the aspect of airlines

#### Skills

is able to organize, cooperate and work in a group, assuming various roles in it, and is able to properly define priorities for the implementation of a task set by himself or others

#### Social competences

understands that in technology, knowledge and skills very quickly become obsolete

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Within the scope of the lecture, verification of the assumed learning outcomes is carried out by passing the test. It has a test form and consists of 31 questions randomly selected from the database of issues discussed during the lecture. 16 points are required to pass. The test is a single choice test and each correct answer to the question is 1 point bc

### Programme content

- Introduction to autonomous systems
- Basic internal sensors
- External sensors
- Sensory data fusion
- Map location and construction
- Traffic planning
- Control
- Software
- Computer vision
- Machine learning
- Legal aspects of autonomous systems



- Development of companies around autonomous systems - case studies

### Teaching methods

A) Lecture: multimedia presentations (slides) illustrated with examples analyzed on the blackboard and program code fragments implementing selected content described during the lecture

### Bibliography

Basic

1. Lentin Joseph, ROS Robotics Projects, Packt Publishing, 2017
2. Computer Vision: Algorithms and Applications (Texts in Computer Science) 2nd ed. 2022 Edition
3. Markus Maurer, J. Christian Gerdes, Barbara Lenz, Hermann Winner, Autonomous Driving – Technical, Legal and Social Aspects, Springer, Berlin, Heidelberg, 2016

Additional

1. Marc P. Deisenroth, A. Aldo Faisal, Cheng Soon Ong, Mathematics for Machine Learning, Cambridge University Press, 2020

### Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,5
Student's own work <sup>1</sup>	20	0,5

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