COURSE DESCRIPTION CARD - SYLLABUS

Course name
Introduction to autonomous systems [S1Lot2>WdSA]

Course

Field of study
Aviation

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

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

Course topics

1. Introduction to Autonomous Systems
2. Power Sources for Autonomous Systems
3. Drives in Autonomous Systems
4. Sensory Systems
5. Sensor Data Fusion
6. Data Processing Systems
7. Basics of Linux
8. Open-Source Software for Autonomous Systems
9. Introduction to Python
10. Example Python Modules
11. Perception and Localization
12. Motion Planning and Control
13. Vision Systems and Deep Learning
14. Legal Aspects and the Development of Companies in the Autonomous Systems Sector

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	2,00
Classes requiring direct contact with the teacher	30	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	0,50