COURSE DESCRIPTION CARD - SYLLABUS

Course name
Flying robots

Course

Field of study
Automatic Control and Robotics
Area of study (specialization)
Automatic Control
Level of study
First-cycle studies
Form of study
full-time

Year/Semester
3/6
Profile of study
general academic
Course offered in
English
Requirements
elective

Number of hours

Lecture
30
Laboratory classes
30
Other (e.g. online)
0
Tutorials
0
Projects/seminars
0

Number of credit points

5

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:

Prerequisites

The student participating in this course should have good programming skills as well as knowledge in signal processing. A proper knowledge in certain fields mathematics , like linear algebra is required. A

student should have the ability to develop and work with basic data acquisition and processing mechanisms. Good social skills, ability to do his/her own research and predispositions to teamwork are required as well. A participent should have adequate respect for safety rules regarding operation of UAVs.

Course objective

The aim of the course is to familiarize students with current solutions in the field of flying robots.

Course-related learning outcomes

Knowledge

K1_W10 [P6S_WG] The graduate has an orderly knowledge of selected algorithms and data structures as well as methodology and techniques of procedural and object-oriented programming. The graduate knows and understands basic processes occurring in the software development cycle.

K1_W16 [P6S_WG] Knows and understands to an advanced level the theory and methods of structures and operating principles of analogue and discrete control systems (open and feedback systems) as well as linear and simple, non-linear analog and digital controllers.

K1_W19 [P6S_WG] The graduate knows and understands to an advanced level the theory and methods in the field of design, application and control of actuators of automatics and robotics.

K1_W23 [P6S_WG] The graduate has the basic knowledge necessary to understand the non-technical determinants of engineering activities and of the automation and robotics process in industry and the household; the graduate is familiar with the basic principles of work safety and health applicable in industry. The graduate knows and understands the basic economic, legal and other conditions of different types of activities related to the given qualification.

Skills

K1_U11 [P6S_UW] The graduate is able to construct an algorithm of a simple measurement and computing-control task, as well as to implement, test and run it in a selected development environment on a microprocessor platform.

K1_U18 [P6S_UW] The graduate is able to select parameters and settings of the basic industrial controller and to configure and program the industrial programmable controller.

Social competences

K1_K3 [P6S_WG] The graduate is aware of responsibility for own work and willingness to conform to the principles of teamwork and taking responsibility for jointly implemented tasks; is able to lead a small team, set goals and set priorities leading to the implementation of the task. The graduate is ready to play a responsible professional role.

K1_K4 [P6S_WG] The graduate is aware of the need for a professional approach to technical issues, meticulous familiarization with the documentation and environmental conditions in which the equipment and its components can operate. The graduate is ready to observe the rules of professional ethics and to demand it from others, to respect the diversity of opinions and cultures.

K1_K5 [P6S_WG] The graduate is ready to think and act in an entrepreneurial way.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written exam (verification of theoretical knowledge) in the field of program content

Laboratory classes: written reports on consequent exercises and practical projects done during classes

Programme content

Getting acquainted with the construction and principle of operation of multicopter flying platforms including legal regulations accompanying it. Programming small scale semi-autonomous UAVs - handling data link, remote control command protocol and video feed. Developing own projects based on gained skills with UAV.

Teaching methods

Lecture with multimedia presentation (including: drawings, photos, animations, sound, films) supplemented with examples given on the board. Discussion during lectures included. Laboratory classes based on practical exercises on hardware and working on in-flight data.

Bibliography

Basic

1. Drony-teoria i praktyka, Bartkiewicz Bartosz , Kruszewski Patryk , Szczepkowski Marek, Kabe 2016

2. Make : Getting started with drones. Terry Kilby, Belinda Kilby, APN Promie, 2016

Additional

1. Handbook of Unmanned Aerial Vehicles, Kimon Valavanis, George Vachtsevanos, Spinger, 2015

Breakdown of average student's workload

	Hours	ECTS
Total workload	105	5
Classes requiring direct contact with the teacher	60	2,0
Student's own work (literature studies , preparation for tests/exam, project preparation) [1]	45	3,0

[1] delete or add other activities as appropriate