COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basic tools and software for autonomous robots

Course

Field of study

Control and robotics

Area of study (specialization)

Intelligent Systems

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2/1

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

8

Tutorials

0

Laboratory classes

16

Projects/seminars

0

Other (e.g. online)

0

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

Prerequisites

A student starting this course should have basic knowledge of robotics and programming. He or she should also have the ability to obtain information from various sources and be ready to cooperate within the team.

Course objective

To provide students with knowledge about the tools used to program autonomous robots, the correct use of these tools and the integration of control systems.

Course-related learning outcomes

Knowledge

1. has detailed knowledge of the methods and tools for programming autonomous robots.

2. has knowledge about the use of the Robot Operating System, parallel processing and hardware support.

3. has knowledge of the tools used to design and integrate robotic control systems for autonomous robots.

Skills

1. has the ability to design and build control systems for mobile and manipulation robots

2) can use tools to integrate autonomous robot control systems

Social competences

1. understands the need to continuously update their knowledge and skills in the tool and programming methods of autonomous robots

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified by one 45-minute exam conducted in an examination session. The examination consists of 20-30 (test) questions and up to 5 open questions, differently scored. The credit threshold: 50% of points. Issues for the examination, on the basis of which the questions are developed are made available during the lecture.

Skills acquired during the laboratory classes are verified on the basis of a credit colloquium consisting of 20 questions and checking the practical implementation of the traffic planning problem. The credit threshold: 50% of points.

Programme content

Lecture:

1 System scripts in bash/python, cron, bashrc, services

2. concurrent processing in C++ (threads, processes)

3. OpenCL (performing operations on a graphic card)

4. CUDA (performing operations on a graphic card)

5. Introduction to Robot Operating System

6. TFs in ROS (reading transformations from previously saved ROS-bags)

Laboratory:

1 System scripts in bash/python, cron, bashrc, services

2. concurrent processing in C++ (threads, processes)

3. OpenCL (performing operations on a graphic card)

4. CUDA (performing operations on a graphic card)

5. Introduction to Robot Operating System

6. TFs in ROS (reading transformations from previously saved ROS-bags)

Teaching methods

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

2. laboratory exercises: instructions carried out on computers and robots available in the laboratory

Bibliography

Basic

Mark Mitchell, Jeffrey Oldham, Alex Samuel, Advanced Linux Programming, New Riders Publishing

Robot Operating System (ROS), Springer 2016

Additional

M. Galewski, STM32. Aplikacje i ćwiczenia w języku C, Wydawnictwo BTC, Legionowo 2011

Breakdown of average student's workload

	Hours	ECTS
Total workload	103	4
Classes requiring direct contact with the teacher	53	2
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	50	2

1 delete or add other activities as appropriate