POZNAN UNIVERSITY OF TECHNOLOGY

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Computer vision [S2AiR2-RiSA>SW]

Course

Field of study	Year/Semester
Automatic Control and Robotics	1/1

Area of study (specialization)	Profile of study
Autonomous Robots and Systems	general academic

Level of study	Course offered in
second-cycle	Polish

Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	30	0

Tutorials	Projects/seminars	
0	0	

Number of credit points

4,00

Coordinators	Lecturers
dr inż. Marek Kraft marek.kraft@put.poznan.pl	

Prerequisites

Knowledge: A student beginning this subject should have basic knowledge of mathematics - including, mainly, matrix calculation, knowledge of elements of mathematical logic, basics of mathematical analysis and probabilistics. Skills: He or she should have the ability to operate a PC and implement simple algorithms and programming tasks. Additionally, the ability to obtain information from indicated sources is essential.

Course objective

The aim of this course is to learn the theoretical basics of image acquisition and processing methods and to learn about typical applications of image processing systems. The student should be able to select an algorithm or a set of algorithms that make up a complete vision system and implement and test such a system on their own.

Course-related learning outcomes

Knowledge:
-

Skills:

-

Social competences:

-

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - final credit test carried out on Moodle plaftorm.
Laboratories - design and final practical programming test.

Programme content

Image acquisition, image encoding methods, basic video encoding.
Using the OpenCV library for image processing.
Processing based on colors and histograms.
Pre-processing of the image - local methods (gamma correction, histogram-based processing, thresholding, etc.).
Contextual methods - evolution, linear and non-linear filtration; morphological operations.
Detection of image features (lines, points).
Image feature description and matching.
Segmentation and analysis of shapes.
The role of lighting in a computer vision systems.
Geometric transformations, spatial vision and multiple view geometry.
Introduction to video sequence analysis - motion detection, object tracking.

Course topics

Teaching methods

Lectures with multimedia presentations, additionally uploaded to a streaming service to be played later.
Laboratory classes covering the implementation and testing of selected algorithms for image and video processing using Python language and solving selected practical problems.

Bibliography

Basic:
1. R. Szeliski, Computer Vision: Algorithms and Applications, Springer, 2010
2. Supplementary course materials posted on Moodle

Additional:
Selected scientific papers related to the course.

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50