POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name
IP-based video surveillance

Course

Field of study	Year/Semester
Electronics and Telecommunications	2/Sem. 4
Area of study (specialization)	Profile of study
	general academic
Level of study	Course offered in
Second-cycle studies	english
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr inż. Sławomir Maćkowiak

slawomir.mackowiak@put.poznan.pl

Responsible for the course/lecturer:

Prerequisites

Has knowledge of programming in C / C + + / Matlab. Has basic knowledge in the field of image processing. Is able to look for information required during educational process and take educational courses, if needed, especially through Internet and distance education. Capable of self-learning (books, computer programs). He acts actively in class, asks questions, knowingly uses the contact with the teacher (eg. consultation

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Course objective

The course meets the latest trends in the industrial use of modern multimedia technologies for video surveillance systems based on IP networks. Knowledge and understanding of the fundamental design video surveillance systems.

Course-related learning outcomes

Knowledge

Has practical knowledge of systems for ensuring the safety of persons and property. Has practical knowledge of the principles of designing CCTV systems.

Skills

Has the ability to construct CCTV basic video processing, record video materials giving the user a number of often selected information necessary to maintain the required level of security of areas and objects to be secured.

Social competences

Is open to the possibility of continuous training and understands the need to improve professional competence. Has a sense of responsibility for designed electronic and telecommunications systems.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired as part of the lecture is verified during the exam. The exam takes the form of a written and / or oral exam. The exam is a collection of several open questions with different levels of difficulty with the assigned number of points. The exam is passed when the number of points scored exceeds 50%.

Completion of the laboratory is based on the current assessment of student progress during the implementation of tasks defined as a result of laboratory instructions and / or the results of assumptions from the discussion at the beginning of the class.

Rating scale: <= 50% 2.0; 51% -60% 3.0; 61% -70% 3.5; 71% -80% 4.0; 81% -90% 4.5; 91% -100% 5.0

Programme content

Lecture: Introduction to video surveillance (IP based video surveillance – basic definition, System architecture, Smart Applications). Background modeling (Gaussian Mixed Model, Features extraction), Motion detection and object tracking (Kalman filters, Partical filters), Object classification (Machine learning - support vector machine algorithm, Machine learning - artificial neural networks and deep learning). Intelligent video data analysis (Object counting, Human activity detection, Crowd detection, Synopsis video).

Laboratory: Analysis of the content of the images. Removing noise and distortion artifacts. Filtering the image, edge detection. Foreground object detection. Motion detection.

Teaching methods

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Traditional lecture

Laboratory - in the early phase of the discussion, then individual / or group work method implementation of the project.

Bibliography

Basic

1.Computer vision : algorithms and applications / Richard Szeliski. Autor: Szeliski, Richard (1958-).Springer-Verlag, cop. 2011.

2. Algorithms for image processing and computer vision / J. R. Parker. Autor: Parker, Jim R. (1955-). Wiley Computer Publishing, cop. 1997

Additional

1. Dr Simon J. D. Prince, Computer Vision: Models, Learning, and Inference, Cambridge University Press; 1 edition (June 18, 2012)

2. Jens R. Ohm, Multimedia Communication Technology, Springer 2004

3. Nillson, Intelligent Network Video: Understanding Modern Video Surveillance Systems, CRC Press; Har/Dvdr edition (September 10, 2008)

4. ISO/IEC IS 13818-1 / ITU-T Rec. H.262: Information technology ? Generic coding of moving pictures and associated audio information. Part 1: Systems, 1997

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	70	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam) [1]	30	1,0

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[1] delete or add other activities as appropriate