Communication systems - course description

General information

Course name	Communication systems
Course ID	11.9-WE-AutD-CommunSyst-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Automatic Control and Robotics / Computer Control Systems
Education profile	academic
Level of studies	Second-cycle Erasmus programme
Beginning semester	winter term 2022/2023

Course information

Semester	2
ECTS credits to win	2
Course type	optional
Teaching language	english
Author of syllabus	• dr inż. Emil Michta, prof. UZ

Classes forms

The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	15	1	-	-	Credit with grade
Laboratory	15	1	-	-	Credit with grade

Aim of the course

- familiarizing students with the basics of building and functioning of local and extensive communication systems,
- familiarizing students with the methods of analyzing time dependencies in communication systems,
- shaping the skills of building and configuring communication systems among students.

Prerequisites

Fundamentals of computer networks and Fundamentals of industrial networks

Scope

Evolution of communication systems. ISO / OSI model and ISA model. Classification of communication systems. Communication model of the network automation system. Analysis of communication parameters. Static and dynamic task models. Analysis of compliance with time restrictions in automation systems. Local communication systems. Industrial networks and local area networks in automation systems. Communication standards of local communication systems. Analysis and synthesis of automation systems with industrial networks. Analysis and synthesis of automation systems with IEEE 802.11 and IEEE 802.15 wireless networks. Industrial Ethernet in local communication systems. Extensive communication systems. Standard and dedicated extensive communication systems in automation applications. Internet technologies and the Internet of Things in automation systems. Time determinism in TCP / IP networks. Protocol tunneling in local systems. Security of transmitted information. Solutions of communication systems in the automation of industrial processes and facilities. Integration of communication systems.

Teaching methods

lecture: discussion, consultation, conventional lecture,

laboratory: discussion, consultation, group work, laboratory exercises

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Has knowledge of the standards, construction and functioning of communication systems		• activity during the classes • an evaluation test	• Lecture
Is able to build and launch selected communication systems		• an observation and evaluation of activities during the classes • an observation and evaluation of the student's practical skills	• Laboratory
Can determine communication parameters for selected communication standards		• activity during the classes • an evaluation test	• Lecture • Laboratory
Is aware of the importance of communication systems in the field of automation and robotics		• activity during the classes • an evaluation test	• Lecture

Assignment conditions

Lecture - the pass condition is to obtain positive grades from written tests carried out in the semester

Laboratory - the condition for passing is obtaining positive grades from all laboratory exercises, planned to be implemented under the laboratory program

Components of the final grade = lecture: 50% + laboratory: 50%

Recommended reading

1. Guinard D.D., Trifa V.: Building the Web of Things with examples in Node.js and Raspberry Pi. Manning, 2016.
2. Irvin D., Wilamowski B.: Industrial Communication Systems. CRC Press, 2011.
3. Thompson L.M.: Industrial Data Communication. ISA, 2009.

Further reading

Notes

Modified by dr inż. Emil Michta, prof. UZ (last modification: 14-04-2022 21:52)

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