

Wireless communication - course description

General information	
Course name	Wireless communication
Course ID	06.0-WE-AutP-WirComm-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Automatic Control and Robotics
Education profile	academic
Level of studies	First-cycle Erasmus programme
Beginning semester	winter term 2022/2023

Course information	
Semester	5
ECTS credits to win	2
Course type	obligatory
Teaching language	english
Author of syllabus	

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	30	2	-	-	Credit with grade

Aim of the course

To familiarize students with various wireless transmission standards, designing and selecting the interface system depending on specific requirements.

To develop skills in starting up and testing wireless communication systems.

To mastery by students of designing of hardware as well as software for wireless communication units.

Prerequisites

Electronics principles

Scope

Introduction to wireless communication. Basic definitions, describing of a variety of transmission media, overview of connecting topologies, classification of transmission types.

Communication using optic medium. Standard IrD, applying infrared and laser lights, design both the hardware and software parts.

Short distance radio transmission. Comparing the parameters of Bluetooth and ZigBee standards, communication in the narrow frequency band, starting up and testing this communication equipment.

Broadband wireless communication. Overview the local network for example WiFi and metropolitan network for example WiMax.

Radio modems. Types overview. Construction and working principles.

Mobile communication. The GSM and UMTS standards, overview of a GSM modem units, data transmission in the GSM network.

Navigation systems; The GPS, Galileo and Glonass standard, differential systems, using a navigation system as a timing source.

Cryptography and data compression. Data transmission without loss of information, auto-correction of transmission errors

Teaching methods

Lecture, laboratory exercises.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Can use programming environments and software tools used to create the software for wireless communication units		<ul style="list-style-type: none">an ongoing monitoring during classescarrying out laboratory reports	<ul style="list-style-type: none">Laboratory
Has the basic knowledge in the area of the operation and architecture of wireless communication systems		<ul style="list-style-type: none">an evaluation test	<ul style="list-style-type: none">Lecture

Outcome description	Outcome symbols	Methods of verification	The class form
Knows and understands the basics of wireless communication system design and configuration methodology		<ul style="list-style-type: none"> • an evaluation test • an ongoing monitoring during classes • carrying out laboratory reports 	<ul style="list-style-type: none"> • Lecture • Laboratory
Can build, configure and test a simple wireless communication system		<ul style="list-style-type: none"> • an ongoing monitoring during classes • carrying out laboratory reports 	<ul style="list-style-type: none"> • Laboratory

Assignment conditions

Lecture – the main condition to get a pass are sufficient marks in written tests conducted at least once per semester.

Laboratory – the main condition to get a pass is scoring sufficient marks for all laboratory exercises.

Calculation of the final grade: lecture 40% + laboratory 60%

Recommended reading

1. Dick Eastman, The Latest in GPS Technology, Copyright by Dick Eastman, 2007
2. L.e Harte, Introduction to Data Networks, 2nd Edition ALTHOS Publishing, 2006
3. S. Gibilisco, Handbook of Radio and Wireless Technology, McGraw-Hill, 1998
4. L. Harte, Wieless technology Basics, ALTHOS Publishing, 2004
5. L. Harte, D. Eckard, Introduction to Optical Communication, ALTHOS Publishing, 2006
6. L. Harte, Introduction to GSM, 2nd Edition ALTHOS Publishing, 2009
7. L. Harte, B. Levitan GPS Quick Course Book, ALTHOS Publishing, 2007

Further reading

Notes

Modified by dr hab. inż. Wojciech Paszke, prof. UZ (last modification: 11-04-2022 09:05)

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