

Title Wireless transmission systems	Code 1010332121010330985
Field Control Engineering and Robotics	Year / Semester 1 / 2
Specialty -	Course elective
Hours Lectures: 2 Classes: - Laboratory: 2 Projects / seminars: -	Number of credits 5
	Language polish

Lecturer:

Tomasz Bilski Ph. d.
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Faculty:

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Status of the course in the study program:

facultative

Assumptions and objectives of the course:

The aim of lecture and laboratory is to provide knowledge on different aspects of contemporary wireless transmission systems. Additionally students should obtain ability to make decisions on wireless network design, intallation and configuration.

Contents of the course (course description):

Lecture

Antennas: types (omnidirectional, sector, directional, "intelligent", MIMO systems), parameters, electromagnetic waves properties, electromagnetic compatibility. Infrared transmission. Coding and modulation. Medium access methods and protocols. Spread spectrum methods: FHSS, DSSS. Wireless transmission standards: 802.11 (WiFi), 802.15 (Bluetooth), 802.16 (WiMAX), 802.20. Mesh networks, routing. Mobile telephone networks: GSM, UMTS, architecture, mode of operation, speech transmission, data transmission. Roaming, handover services. Mobile IPv6. Wireless network security. Legal aspects of radio bandwidth utilization.

Laboratory

IEEE 802.11 standards. Active elements configuration for ad-hoc and infratructure networks. Interference, RTS-CTS messages, CSMA/CA protocol in multiple access medium. Frames analysis: control, management, data. Performance transmission tests (bandwidth vs. throughput). Optimum configuration: modes of operation, modulation, power, fragmentation threshold, DTIM, control frames distribution time; antennas. Roaming in 802.11 networks. Data security elements (WEP, TKIP, CCMP, RADIUS, 802.11x) and their impact on network performance. IEEE 802.11e. QoS, configuration and transmission analysis. IEEE 802.15.1 and IrDA - configuration and tests. Performance measurement. IEEE 802.16. Configuration, antenna selection. Performance measurement. GSM, GPRS, EDGE, UMTS. Analysis, performance measurement, security, QoS, roaming.

Introductory courses and the required pre-knowledge:

Electronics, computer networks

Courses form and teaching methods:

Lecture: multimedia presentation.

Laboratory: practical network configuration, tests, measurements, analysis.

Form and terms of complete the course - requirements and assessment methods:

Lecture: written exam.

Laboratory: short written tests before experiments, evaluation of experiments and reports.

Basic Bibliography:

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Additional Bibliography:

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