Faculty of Fundamental Problems of Technology

COURSE CARD

Name in polish	:	**Wprowadzenie do Systemów Telekomunikacji Bezprzewodowej**
Name in english	:	**Introduction to Wireless Telecomunication Systems**
Field of study	:	Computer Science
Specialty (if applicable)	:	
Undergraduate degree and form of	:	masters, stationary
Type of course	:	optional
Course code	:	E2_W19
Group rate	:	Yes

	Lectures	Exercides	Laboratory	Project	Seminar
Number of classes held in schools (ZZU)	30	30			
The total number of hours of student workload (CNPS)	60	120			
Assesment	pass				
For a group of courses final course mark	X				
Number of ECTS credits	3	3			
including the number of points corresponding to the classes of practical (P)		3			
including the number of points corresponding occupations requiring direct contact (BK)	3	3			

PREREQUISITES FOR KNOWLEDGE, SKILLS AND OTHER POWERS

background in electromagnetics and mathematical analysis

COURSE OBJECTIVES

C1 presentation of key concepts used in the construction of wireless communication systems

C2 solving optimization problems in the construction of wireless communication networks

COURSE LEARNING OUTCOMES

The scope of the student's knowledge:

W1 physical background for wireless communication systems

W2 analytical models for wireless communication

W3 technologies and systems for reliability and security in wireless communication

The student skills:

U1 has skills in designing and optimization of wireless networks

U2 can model and analyze performance of wireless communication systems

U3 can estimate safety level and identify threats for wireless communication systems

The student's social competence:

K1 can cooperate with telecommunication engineers

K2 can use literature and technical documentation regarding telecommunication systems

K3 can create IT solutions according to the telecommunication engineering

COURSE CONTENT

Type of classes - lectures		
Wy1	introduction to contemporary wireless communication systems: 2G/3G/4G; WLANs/Bluetooth	2h
Wy2	radio signal propagation: large scale path loss	2h
Wy3	radio signal propagation: small-scale fading and multipath	2h
Wy4	modulation techniques	2h
Wy5	compensation, diversity, channel encoding	2h
Wy6	voice encoding	2h
Wy7	radio access techniques	2h
Wy8	wireless networking	2h
Wy9	chosen aspects of cellular systems 2G, 3G and 4G	4h
Wy10	network planning and optimization	2h
Wy11	authentication and encryption in wireless systems	4h
Wy12	special purpose wireless systems	4h
Type of classes - exercises		
Ćw1	chosen aspects of physics of radio waves	4h
Ćw2	2G/3G/4G systems	4h
Ćw3	propagation methods	2h
Ćw4	channel allocation, interferences of signals	2h
Ćw5	modulation techniques	2h
Ćw6	multiaccess	2h
Ćw7	error detection and correction codes	2h
Ćw8	access control and handoff	2h
Ćw9	access scheduling	2h
Ćw10	network optimization	4h
Ćw11	security techniques in 2G/3G/4G	4h

Applied learning tools
1. Traditional lecture 2. Multimedia lecture 3. Solving tasks and problems 4. Consultation 5. Self-study students

EVALUATION OF THE EFFECTS OF EDUCATION ACHIEVEMENTS		
Value	Number of training effect	Way to evaluate the effect of education
F1	W1-W3, K1-K3	written tests
F2	U1-U3, K1-K3	weekly tests, home assignments
P=50%*F1+50%*F2		

BASIC AND ADDITIONAL READING
1. Mobile wireless communications. Mischa Schwartz, ISBN: 978-0-511-26423-8 2. LTE, WiMAx and WLAN network design, optimization and performance analysis. Leonhard Korowajczuk, ISBN: 9780470741498

SUPERVISOR OF COURSE
prof. Mirosław Kutyłowski

RELATIONSHIP MATRIX EFFECTS OF EDUCATION FOR THE COURSE
Introduction to Wireless Telecomunication Systems
WITH EFFECTS OF EDUCATION ON THE DIRECTION OF COMPUTER SCIENCE

Course training effect	Reference to the effect of the learning outcomes defined for the field of study and specialization (if applicable)	Objectives of the course**	The contents of the course**	Number of teaching tools**
W1	K2_W01 K2_W03_B K2_W04_B K2_W05 K2_W09	C1	Wy1-Wy12	1 2 4 5
W2	K2_W01 K2_W02 K2_W04_B K2_W05 K2_W07	C1	Wy1-Wy12	1 2 4 5
W3	K2_W01 K2_W02 K2_W04_B K2_W05 K2_W06 K2_W07 K2_W08 K2_W09 K2_W10	C1	Wy1-Wy12	1 2 4 5
U1	K2_U01_B K2_U02 K2_U05_B K2_U09_B K2_U10 K2_U11 K2_U12_B K2_U13 K2_U14 K2_U16 K2_U17 K2_U18_B K2_U19_B K2_U20 K2_U21_B K2_U22_B	C2	Ćw1-Ćw11	3 4 5
U2	K2_U01_B K2_U02 K2_U03_B K2_U08_B K2_U09_B K2_U10 K2_U11 K2_U12_B K2_U14 K2_U15 K2_U16 K2_U18_B K2_U19_B K2_U20 K2_U21_B	C2	Ćw1-Ćw11	3 4 5
U3	K2_U01_B K2_U03_B K2_U05_B K2_U08_B K2_U09_B K2_U10 K2_U12_B K2_U13 K2_U15 K2_U16 K2_U17 K2_U18_B K2_U19_B K2_U20 K2_U21_B K2_U22_B	C2	Ćw1-Ćw11	3 4 5
K1	K2_K01_B K2_K03 K2_K05 K2_K06 K2_K08 K2_K11 K2_K12 K2_K13 K2_K14_B	C1 C2	Wy1-Wy12 Ćw1-Ćw11	1 2 3 4 5
K2	K2_K01_B K2_K03 K2_K05 K2_K14_B K2_K15 K2_K16	C1 C2	Wy1-Wy12 Ćw1-Ćw11	1 2 3 4 5
K3	K2_K01_B K2_K03 K2_K06 K2_K08 K2_K12 K2_K13	C1 C2	Wy1-Wy12 Ćw1-Ćw11	1 2 3 4 5