FACULTY OF ELECTRICAL ENGINEERING

SUBJECT CARD

Name in Polish:	**Bezprzewodowe systemy sterowania i kontroli**
Name in English:	**Wireless control and monitoring systems**
Main field of study (if applicable):	**Control Engineering and Robotics**
Specialization (if applicable):	**Automation of Machines, Vehicles and Apparatus**
Level and form of studies:	**2nd level, full-time**
Kind of subject:	**obligatory**
Subject code:	**ARR043227**
Group of courses:	**NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	30				
Number of hours of total student workload (CNPS):	60				
Form of crediting:	crediting with grade				
For group of courses mark (X) final course:					
Number of ECTS points:	2				
including number of ECTS points for practical (P) classes :					
including number of ECTS points for direct teacher-student contact (BK) classes:	1.40				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Has a knowledge of industrial automation systems and communication networks.
2. Has a knowledge of computer systems.

SUBJECT OBJECTIVES

C1. Has a knowledge of the architecture of the wireless guidance and control systems.
C2. Has a knowledge of the wireless data transmission techniques in the guidance nad control systems.
C3. Familiarize students with a knowledge of the data communication protocols in wireless networks.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 Has a knowledge of the architecture of the wireless guidance and control systems.
PEK_W02 Has a knowledge of the wireless data transmission techniques in the guidance nad control systems
PEK_W03 Has a knowledge of the protocols used in wireless transmission systems.

relating to skills:

relating to social competences:

PEK_K01 The acquisition and consolidation of competence in the independent and creative thinking.

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours:**
Lec 1	Introductory classes. Basic definitions and notions. A network theoretical model OSI/ISO.	2
Lec 2	Real-time systems. The components of distributed systems.	2
Lec 3	Data coding techniques	2
Lec 4	Sending data via infrared IrDA.	2
Lec 5	Sending data via radio link. Network topologies, data transmission techniques, modems.	2
Lec 6	Sending data via GSM/GPRS. Preliminary information.	2
Lec 7	GSM/GPRS topologies, data transmission techniques, modems.	2
Lec 8	Sending data via EDGE/WiMax. Network topologies, data transmission techniques.	2
Lec 9	The use of Ethernet for wireless data transfer: technology of Wi-Fi.	2
Lec 10	Wi-Fi topologies, data transmission techniques, apparatus.	2
Lec 11	The use of Bluetooth technology for wireless data transfer. Data transfer technology and equipment. Description of the data transfer protocol.	2
Lec 12	ZigBee standard for data transmission. Description of standard, data transmission technology, apparatus.	2
Lec 13	RFID communication.	2
Lec 14	Sensor Networks	2
Lec 15	Written test	2
	Total hours:	**30**

TEACHING TOOLS USED
N1. Lecture using modern multimedia techniques.
N2. Consultation.
N3. Written test.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation *F – forming (during semester)* *P – concluding (at semester end)*	**Educational effect number**	**Way of evaluating educational effect achievement**
F1(W)	PEK_W01 PEK_W02 PEK_W03	Written test
P(W)	P=F1	

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE:
[1] Werewka J., Systemy rozproszone sterowania i akwizycji danych, CCATIE vol. 9, Kraków 1998 [2] Grega W., Sterowanie cyfrowe w czasie rzeczywistym, Wyd. wydz. AAIiE AGH, Kraków 1999 [3] Ross J., Sieci bezprzewodowe : przewodnik po sieciach Wi-Fi i szerokopasmowych sieciach bezprzewodowych, Wyd. Helion, Gliwice, 2009 [4] Kurytnik I., P., Karpiński M., Bezprzewodowa transmisja informacji, Wyd. PAK, Warszawa, 2008 [5] Engst A. C., Sieci bezprzewodowe : praktyczny przewodnik, Wyd. Helion, Gliwice, 2005 [6] Ludwin W., Bluetooth : nowoczesny system łączności bezprzewodowej, Wyd. AGH, Kraków, 2003 [7] Hołubowicz W., Płóciennik P., Cyfrowe systemy telefonii komórkowej GSM 900, GSM 1800, UMTS, Wyd. OST HOLKOM, Poznań, 1998
SECONDARY LITERATURE:
[1] www.wi-fi.org. [2] www.wimaxfotum.org [3] www.networld.pl

SUBJECT SUPERVISOR
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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
ARR043227 - Wireless control and monitoring systems
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Control Engineering and Robotics**
AND SPECIALIZATION **Automation of Machines, Vehicles and Apparatus**

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)	Subject objectives	Programme content	Teaching tool number
PEK_W01	S2AMPU_W11	C.1 C.2 C.3	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.2 N.3
PEK_W02	S2AMPU_W11	C.1 C.2 C.3	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.2 N.3
PEK_W03	S2AMPU_W11	C.1 C.2 C.3	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.2 N.3
PEK_K01	K2AiR_K06	C.1 C.2 C.3	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.2 N.3