

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): **Industrial Control Engineering**
 Specialization (if applicable): **Automation of Machines, Vehicles and Apparatus**
 Level and form of studies: **2nd level, full-time**
 Kind of subject: **obligatory**
 Subject code: **APR013227**
 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 LEARNING OUTCOMES*relating to knowledge:*

- PEU_W01 Has a knowledge of the architecture of the wireless guidance and control systems.
 PEU_W02 Has a knowledge of the wireless data transmission techniques in the guidance nad control systems
 PEU_W03 Has a knowledge of the protocols used in wireless transmission systems.

*relating to skills:**relating to social competences:*

- PEU_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.	2
Lec 3	Data coding techniques.	2
Lec 4	Sending data via radio link. Network topologies, data transmission techniques, modems.	2
Lec 5	Sending data via infrared IrDA.	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 Bluetooth technology for wireless data transfer. Data transfer technology and equipment. Description of the data transfer protocol.	2
Lec 10	ZigBee standard for data transmission. Description of standard, data transmission technology, apparatus.	2
Lec 11	Using Ethernet for wireless data transfer. Technology and topology of wi-fi, data transfer techniques, devices.	4
Lec 12	RFID communication.	2
Lec 13	Sensor Networks.	2
Lec 14	Written test	2
Total hours:		30

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

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT		
Evaluation <i>F - forming (during semester)</i> <i>P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(w)	PEU_W01 PEU_W02 PEU_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. wyd. AAIE 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.wimaxforum.org [3] www.networld.pl

SUBJECT SUPERVISOR
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