Faculty of Fundamental Problems of Technology

COURSE CARD

Name in polish	:	**Wstęp do Elektroniki dla Systemów Bezpieczeństwa**
Name in english	:	**Introduction to Electronics for Security Engineers**
Field of study	:	Computer Science
Specialty (if applicable)	:	
Undergraduate degree and form of	:	masters, stationary
Type of course	:	optional
Course code	:	E2_W20
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

Basic knowledge of electromagnetism and electricity derived from science classes at high-school level.

COURSE OBJECTIVES

C1 understanding fundamental mechanism of functionality of electronic systems

C2 skills in analysis and modelling of electronic systems

COURSE LEARNING OUTCOMES

The scope of the student's knowledge:

W1 electronics background for information systems

W2 analytical models for fundamental electronic systems

W3 security technologies in electronics

The student skills:

U1 can adapt a computer system to security requirements taking into account electronics

U2 can analyze functionality of simple electronic components

U3 can design simple electronic components

U4 can carry out basic experiments and interpret the measurement results

The student's social competence:

K1 Can co-operate with electronic engineers - security specialists.

K2 Is capable of understanding non-polish literature on the subject.

K3 Can identify risks beyond his/her own field of expertise.

K4 Constructs requirements for software/hardware systems including information from other areas of knowledge.

COURSE CONTENT

Type of classes - lectures		
Wy1	Electronic properties of materials	2h
Wy2	Diodes and diode circuits	4h
Wy3	MOS transistors and biasing	2h
Wy4	MOS logic families	4h
Wy5	Bipolar transistors and logic families	4h
Wy6	Design parameters and issues	2h
Wy7	Storage elements	2h
Wy8	Interfacing logic families and standard buses	2h
Wy9	Amplifiers	2h
Wy10	Circuit modeling and simulation	2h
Wy11	Information leakage	2h
Wy12	Tamper evidence and resistance	2h
Type of classes - exercises		
Ćw1	Current consumption in logic circuits.	4h
Ćw2	Random bits generation.	4h
Ćw3	Race condition in flip-flops. Random bits generation.	4h
Ćw4	Tapping of communcation bus.	4h
Ćw5	Radio sniffer.	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-K4	test
F2	U1-U4, K1-K4	?
P=50%*F1+50%*F2		

BASIC AND ADDITIONAL READING
1. Charles Schuler: Electronics : principles & applications 2. Paul Horowitz, Winfield Hill: The art of electronics 3. SPICE: http://bwrc.eecs.berkeley.edu/classes/icbook/spice/

SUPERVISOR OF COURSE
dr inż. Przemysław Błaskiewicz

RELATIONSHIP MATRIX EFFECTS OF EDUCATION FOR THE COURSE
Introduction to Electronics for Security Engineers
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_W07	C1	Wy1-Wy12	1 2 4 5
W3	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_U12_B K2_U15 K2_U18_B K2_U19_B K2_U21_B K2_U22_B	C2	Ćw1-Ćw5	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	C2	Ćw1-Ćw5	3 4 5
U3	K2_U01_B K2_U02 K2_U03_B K2_U08_B K2_U09_B K2_U11 K2_U19_B K2_U20	C2	Ćw1-Ćw5	3 4 5
U4	K2_U03_B K2_U14 K2_U18_B K2_U19_B K2_U21_B	C2	Ćw1-Ćw5	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-Ćw5	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-Ćw5	1 2 3 4 5
K3	K2_K01_B K2_K02 K2_K03 K2_K11 K2_K12	C1 C2	Wy1-Wy12 Ćw1-Ćw5	1 2 3 4 5
K4	K2_K01_B K2_K03 K2_K06 K2_K08 K2_K09 K2_K12 K2_K13	C1 C2	Wy1-Wy12 Ćw1-Ćw5	1 2 3 4 5