Faculty of Fundamental Problems of Technology

COURSE CARD

Name in polish	:	**Systemy Wbudowane w Bezpieczeństwie Komputerowym**
Name in english	:	**Embedded Security Systems**
Field of study	:	Computer Science
Specialty (if applicable)	:	
Undergraduate degree and form of	:	masters, stationary
Type of course	:	compulsory
Course code	:	`E2_BI02`
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		90		
Assesment	exam				
For a group of courses final course mark	X				
Number of ECTS credits	2		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)	2		3		

PREREQUISITES FOR KNOWLEDGE, SKILLS AND OTHER POWERS

Fluency in programming, designing efficient algorithms, estimating computational complexity. Basic knowledge on computer systems architecture, operating systems and communication protocols.

COURSE OBJECTIVES

C1 presentation of architecture, limitations and fonalities of embedded systems used in security area

C2 developing programming skills concerning cryptographic smart cards and FPGA

COURSE LEARNING OUTCOMES

The scope of the student's knowledge:

W1 architecture, programming and limits of smart chip-cards

W2 architecture, programming and limits of programmable logic circuits

W3 architecture, programming and limits of sensory networks

W4 architecture, programming and limits of RFID tags

W5 architecture of CUDA, intricacies of programming and compiling, calculation complexity

The student skills:

U1 Capability to create chip-card application

U2 Capability to produce code for an FPGA system

U3 Capability to design a monitoring sensory field

U4 Capability to design an RFID-based system following security requirements

U5 Capability to design parallel algorithms for implementation in CUDA systems

U6 Capability to utilise High-Security Modules

The student's social competence:

K1 can design a system with respect to the expected social behaviour of its users

K2 can estimate the risk factor for a functioning system

K3 can create solutions oblivious to the end-user

K4 can estimate the potential of criminal activities

COURSE CONTENT

Type of classes - lectures		
Wy1	smart cards	6h
Wy2	HSM systems	2h
Wy3	programmable logic arrays	6h
Wy4	sensor systems	4h
Wy5	RFID tags	6h
Wy6	CUDA	6h

Type of classes - laboratory		
Lab1	cryptographic smart cards	15h
Lab2	programming on FPGA	15h

Applied learning tools
1. Traditional lecture 2. Multimedia lecture 3. Solving tasks and problems 4. Creating programming projects 5. Consultation 6. Self-study students

EVALUATION OF THE EFFECTS OF EDUCATION ACHIEVEMENTS		
Value	Number of training effect	Way to evaluate the effect of education
F1	W1-W5, K1-K4	
F2	U1-U6, K1-K4	
P=%*F1+%*F2		

BASIC AND ADDITIONAL READING
1. Smart Card Handbook. Wolfgang Rankl, Wolfgang Effing, ISBN: 978-0-470-74367-6 2. Theoretical Aspects of Distributed Computing in Sensor Networks. Nikoletseas, Sotiris; Rolim, José, ISBN: 978-3-642-14848-4 3. Handbook of Sensor Networks. Yang Xiao, Hui Chen, Frank Haizhon Li, ISBN: 978-981-283-730-1 4. Embedded Systems Design with Platform FPGAs: Principles and Practices. Ronald Sass , Andrew G. Schmidt, ISBN:0123743338 5. Embedded Systems: A Contemporary Design Tool. James K. Peckol. ISBN: 0471721808 6. normative documents

SUPERVISOR OF COURSE
dr inż. Przemysław Błaskiewicz

RELATIONSHIP MATRIX EFFECTS OF EDUCATION FOR THE COURSE
Embedded Security 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_W06 K2_W07 K2_W08 K2_W09 K2_W10	C1	Wy1-Wy6	1 2 5 6
W2	K2_W01 K2_W02 K2_W03_B K2_W04_B K2_W05 K2_W06 K2_W07 K2_W08 K2_W09 K2_W10	C1	Wy1-Wy6	1 2 5 6
W3	K2_W01 K2_W02 K2_W03_B K2_W04_B K2_W05 K2_W06 K2_W07 K2_W08 K2_W09 K2_W10	C1	Wy1-Wy6	1 2 5 6
W4	K2_W01 K2_W02 K2_W03_B K2_W04_B K2_W05 K2_W06 K2_W07 K2_W08 K2_W09 K2_W10	C1	Wy1-Wy6	1 2 5 6
W5	K2_W01 K2_W02 K2_W03_B K2_W04_B K2_W05 K2_W06 K2_W07 K2_W08 K2_W09 K2_W10	C1	Wy1-Wy6	1 2 5 6
U1	K2_U01_B K2_U02 K2_U08_B K2_U10 K2_U12_B K2_U13 K2_U16 K2_U18_B K2_U19_B K2_U20 K2_U21_B	C1	Lab1-Lab2	3 4 5 6
U2	K2_U01_B K2_U02 K2_U08_B K2_U09_B K2_U10 K2_U12_B K2_U13 K2_U16 K2_U18_B K2_U19_B K2_U20 K2_U21_B	C1	Lab1-Lab2	3 4 5 6
U3	K2_U01_B K2_U02 K2_U08_B K2_U09_B K2_U10 K2_U12_B K2_U13 K2_U16 K2_U17 K2_U18_B K2_U19_B K2_U20 K2_U21_B K2_U22_B	C1	Lab1-Lab2	3 4 5 6
U4	K2_U01_B K2_U02 K2_U08_B K2_U09_B K2_U10 K2_U12_B K2_U13 K2_U16 K2_U17 K2_U18_B K2_U19_B K2_U20 K2_U21_B K2_U22_B	C1	Lab1-Lab2	3 4 5 6
U5	K2_U01_B K2_U02 K2_U08_B K2_U09_B K2_U10 K2_U12_B K2_U13 K2_U16 K2_U17 K2_U18_B K2_U19_B K2_U20 K2_U21_B K2_U22_B	C1	Lab1-Lab2	3 4 5 6
U6	K2_U01_B K2_U08_B K2_U10 K2_U12_B K2_U13 K2_U16 K2_U17 K2_U18_B K2_U19_B K2_U20 K2_U21_B K2_U22_B	C1	Lab1-Lab2	3 4 5 6
K1	K2_K01_B K2_K04 K2_K05 K2_K07 K2_K10 K2_K12 K2_K13	C1 C2	Wy1-Wy6 Lab1-Lab2	1 2 3 4 5 6
K2	K2_K02 K2_K07 K2_K09 K2_K10 K2_K11 K2_K12 K2_K13	C1 C2	Wy1-Wy6 Lab1-Lab2	1 2 3 4 5 6
K3	K2_K01_B K2_K02 K2_K04 K2_K05 K2_K07 K2_K10 K2_K12 K2_K13 K2_K14_B K2_K15 K2_K16	C1 C2	Wy1-Wy6 Lab1-Lab2	1 2 3 4 5 6
K4	K2_K01_B K2_K03 K2_K04 K2_K10 K2_K11 K2_K13 K2_K14_B K2_K15 K2_K16	C1 C2	Wy1-Wy6 Lab1-Lab2	1 2 3 4 5 6