Faculty of Fundamental Problems of Technology

COURSE CARD

Name in polish	:	**Obliczenia energooszczędne**
Name in english	:	**Green Computing**
Field of study	:	Computer Science
Specialty (if applicable)	:	
Undergraduate degree and form of	:	masters, stationary
Type of course	:	optional
Course code	:	E2_W32
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)	90		90		
Assesment	exam				
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

COURSE OBJECTIVES

C1 Presentation of data management mechanisms in the cloud and of remote administration infrastructure enabling environmentally friendly data processing. Discussion on the tools built into the cloud platform and software extensions available. Addressing the legal aspects of the proposed solutions.

C2 The aim of the laboratory is to test the mechanisms built into the cloud computing platform connected to provisioning of data processing in an environmentally friendly manner. Students perform exercises from the administrator's perspective, allocating resources efficiently in order to reduce: energy consumption, heat emission, the cost of data transmission, etc., without reducing the efficiency of calculations.

COURSE LEARNING OUTCOMES

The scope of the student's knowledge:

W1 Knows the environmental risks of inefficient processing of data in information systems.

W2 Knows the mechanisms built into cloud computing platform allowing for efficient and environmentally friendly processing of data

W3 Knows the basic acts and legal norms and conventions in industry, concerning the processing of data in information systems in an environmentally friendly manner.

The student skills:

U1 Can allocate platform resources according to the criteria of processing efficiency.

U2 Can use administrative software tools of the platform to optimize: the cost of energy, heat, etc.

U3 Can reconfigure remote computing environment adaptively, according to changing processing conditions and limitations.

The student's social competence:

K1 Understands the need for public awareness of the need to conserve energy in computing.

COURSE CONTENT

Type of classes - lectures		
Wy1	Introduction to Green Computing	2h
Wy2	Storage allocation techniques	2h
Wy3	Storage efficiency by virtualization and deduplication	4h
Wy4	Efficient communication schemes	2h
Wy5	Communication cost and complexity reduction	4h
Wy6	Traffic reduction - transforming the datacenter network	2h
Wy7	Virtualization technologies for datacenter network	2h
Wy8	Energy saving in cloud computng	4h
Wy9	Algorithms of efficient workloads	2h
Wy10	Parallel and distributed processing and load balancing	2h
Wy11	Server technology supporting cloud in a green data center	2h
Wy12	Legal and procedureal issues	2h
Type of classes - laboratory		
Lab1	Tivoli service automation manager	4h
Lab2	VMware server with a monitoring agent	4h
Lab3	Monitoring a virtual server	4h
Lab4	Tivoli service automation manager reports	4h
Lab5	Monitoring power consumption	4h
Lab6	Reducing power consumption	4h
Lab7	Configuring the client-side dashboard	4h
Lab8	Working with wake-on-LAN	2h

Applied learning tools
1. Traditional lecture 2. Multimedia lecture 3. Solving programming tasks 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-K1	An exam
F2	U1-U3, K1-K1	Fulfillment of tasks
P=50%*F1+50%*F2		

BASIC AND ADDITIONAL READING
1. Tomasz Mielnik, Green Computing. Students Handbook.

SUPERVISOR OF COURSE
dr Mirosław Korzeniowski

RELATIONSHIP MATRIX EFFECTS OF EDUCATION FOR THE COURSE
Green Computing
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_W05 K2_W06 K2_W07	C1	Wy1-Wy12	1 2 4 5
W2	K2_W04 K2_W05 K2_W06 K2_W07	C1	Wy1-Wy12	1 2 4 5
W3	K2_W03 K2_W07 K2_W08	C1	Wy1-Wy12	1 2 4 5
U1	K2_U16 K2_U17 K2_U19	C1	Lab1-Lab8	3 4 5
U2	K2_U19 K2_U20 K2_U21	C1	Lab1-Lab8	3 4 5
U3	K2_U16 K2_U19 K2_U21	C1	Lab1-Lab8	3 4 5
K1	K2_K05	C1 C2	Wy1-Wy12 Lab1-Lab8	1 2 3 4 5