Zał. nr 4 do ZW 64/2012

FACULTY OF COMPUTER SCIENCE AND MANAGEMENT

SUBJECT CARD

Name in Polish: Sieci komputerowe

Name in English: Computer networks and communication

Main field of study (if applicable): Computer Science

Specialization (if applicable): ……..

Level and form of studies: 1st level, full-time

Kind of subject: obligatory

Subject code INZ0262W, INZ0262l

Group of courses: NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	90		60		
Form of crediting	Examination		Crediting with grade		
For group of courses mark (X) final course					
Number of ECTS points	3		2		
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	1,8		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Has a basic knowledge of linear algebra, analytic geometry and mathematical analysis, necessary for solving simple problems of an engineering calculation of technical and non-technical disciplines (K1INF_W01)
2. Has a basic knowledge of discrete mathematics, mathematical logic and mathematical statistics, the necessary information to solve simple engineering problems (K1INF_W02)
3. Has a basic knowledge of computer organization and architecture (K1INF_W08)
4. Has a basic knowledge of the design and operation of operating systems (K1INF_W10)
5. Can use indicated an analytical method and plan and carry out a simple experiment and computer simulation engineering, conduct a survey and analyze the results, particularly for the selected system components (K1INF_U09)
6. Knows the basic methods and tools for collecting, processing and retrieval of information

and to extract knowledge (K1INF_W16)

7. Can use the right tools to build a simple model of the process (the object), to formulate a specific task analysis and decision making (K1INF_U15)
8. Has the ability to self-education, including in order to improve professional competence (K1INF_U05)
9. Understands and knows the need continuous training opportunities and improving their social skills and (K1INF_K01)

SUBJECT OBJECTIVES

C1. Ordered, underpinned by theoretical knowledge in the field of taxonomy, structure and applications of computer networks, circuit switching and switching messages and tiered hierarchical models of computer networks, construction and functionality of network protocols, network protocols, rules of cooperation in piles according to protocols and analysis of quantitative and qualitative existing networks computer.

C2. Skills of analysis, design and configuration of network solutions using network models, standards and protocol stacks, formulation design and analysis tasks of network solutions and assess the suitability of a variety of networking solutions for the implementation of various services distributed systems.

C3. Skills for the selection of the appropriate variety of networking solutions to achieve business goals supported by IT systems.

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:
K1INF_W11: Has basic knowledge of IT systems and computer networks
K1INF_W12: Has basic knowledge in the field of distributed systems architecture and methods for multiprocessor and distributed computing
K1INF_W14: Has basic knowledge of the architecture of the Internet and Web-based systems

Relating to skills:
K1INF_U05: Has the ability to self-study, including in order to improve the professional competence
K1INF_U06: Can choose the hardware and software components of a computer system for specific applications
K1INF_U08: Can configure basic network hardware and software in computer networks
K1INF_U11: Can obtain information from literature, databases and other sources, also in English, including for the purposes of self-education and improving professional skills, able to integrate the information, make their interpretation, as well as draw conclusions and formulate and justify opinions.

Relating to social competences:
K1INF_K01: Understands and knows the need for continuous training opportunities and improve their professional competence and social
K1INF_K04: He can appropriately prioritize for implementation specified by you or other tasks

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours**
Lec 1	Classification of computer networks	2
Lec 2	Circuit switching and message switching (packet switching). Evaluation of the effectiveness of resource use in networks with different switching methods. The optimal packet length (task fromulation). Classification of data communications traffic.	2
Lec 3	Connecting open systems model (Open Systems Interconnection model) and other models of computer networks	2
Lec 4	Layered network models and principles of cooperation between the layers	2
Lec 5	Open Systems Interconnection model layers – the physical layer	2
Lec 6	Medium access method in local and wide area networks, wired and wireless networks	2
Lec 7	Open Systems Interconnection model layers - the data link layer. Implementations of the data link layer functions in different network standards.	2
Lec 8	HDLC (High Level Data Link Control) protocol as an example of the connection in the data link layer	2
Lec 9	Open Systems Interconnection model layers - the network layer. Implementations of the network layer functions in different network standards.	2
Lec 10	Measures of the quality of services provided by networks serving streaming and elastic traffic. The tasks of routing and flow control	2
Lec 11	Node queuing model of packet-switched networks	2
Lec 12	IP (Internet Protocol) as an example of connectionless protocol at the network layer. Addressing issues in networks.	2
Lec 13	Congestions and congestion control tasks in packet switched networks.	2
Lec 14	TCP (Transport Control Protocol) as an example of protocol at the transport layer connection	2
Lec 15	Guidelines for the development of a network of circuit switched and packet switched. Concepts of providing the quality of services in computer networks. New generations of computer networks.	2
	Total hours	**30**

PROGRAMME CONTENT		
Form of classes - laboratory		**Number of hours**
Lab 1	Organizational Information.	2
Lab 2	Physical media, making the cables.	2
Lab 3	Communication over the network. Wired computers connections.	2

Lab 4	Using Wireshark™ to view and examine protocol data units. Application layer protocols.	2
Lab 5	IPv4 addressing. Packet Tracer. Network simulator.	2
Lab 6	Using Wireshark™ to view protocol data units. Network and transport layer protocols.	2
Lab 7	Establishing a console session with switch/router. Basic Cisco device configuration.	2
Lab 8	Basic Cisco device configuration part 2. Managing router and switch configuration. Password recovery procedure.	2
Lab 9	Final exam from Cisco CCNA (Cisco Certified Network Associate) Exploration semester 1	2
Lab 10	Creating VLAN (Virtual Local Area Network) network on switches. Connections between switches with trunk lines.	2
Lab 11	Managing the VLANs with VTP (Virtual Transfer Protocol) protocol	2
Lab 12	Basic static route configuration	2
Lab 13	Basic Inter-VLAN routing	2
Lab 14	Basic RIP (Routing Information Protocol) configuration	2
Lab 15	Exams Cisco CCNA (Cisco Certified Network Associate) Exploration. Grading.	2
	Total hours	**30**

TEACHING TOOLS USED
N1. Traditional lecture. Multimedia presentations.
N2. Student's own works – solving experiments and tasks in laboratory.
N3. Student's own works – literature studies.
N5. Collective works in laboratory
N5. Student's own works – preparation of presentations and technical documentations.

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 (lecture)	K1INF_W11 K1INF_W12 K1INF_W14 K1INF_U05 K1INF_U06 K1INF_U08 K1INF_U11	Observation of student's activity. Solving exercises. Preparation and presentation delivery.

	K1INF_K01 K1INF_K04	
F1 – F15 (laboratory)	K1INF_U05 K1INF_U06 K1INF_U08 K1INF_U11 K1INF_K01 K1INF_K04	Checking the preparation of the student. Checking the presence of the student. Observation of student activity. Observation and evaluation of student independence. Analysis of reports of exercise.
P (lecture)	K1INF_W11 K1INF_W12 K1INF_W14 K1INF_U05 K1INF_U06 K1INF_U08 K1INF_U11 K1INF_K01 K1INF_K04	Examination taking into account results of forming evaluation F1 (lecture)
P (laboratory)	K1INF_U05 K1INF_U06 K1INF_U08 K1INF_U11 K1INF_K01 K1INF_K04	Weighted sum of forming evaluations F1 – F15 (laboratory).

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] A.S. Tanenbaum, „Computer networks", Prentice Hall; 1996
[2] G. Pujolle, D. Seret, D. Dromard, E. Horlait, „Integrated Digital Communication Networks", J. Wiley & Sons
[3] B. Russell, „The art of computer networks", Prentice Hall; 2009
[4] V.S. Bagad, I.A. Dhotre, „Computer networks", Technical Publications, 2009.
[5] http://www.freebookcentre.net/Networking/Free-Computer-Networking-Books-Download.html
[6] M. Roden, „Analog and digital communication systems", Prentice Hall

SECONDARY LITERATURE:

[1] MIT open cources:http://ocw.mit.edu/courses/electrical-engineering-and-computer-science
[2] CCNA Exploration Network Fundamentals, Cisco Academy, PWN, 2008
[3] http://www.freebookcentre.net/Networking/Free-Computer-Networking-Books-Download.html

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

Adam Grzech, adam.grzech@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Information and signals theory

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ……..
AND SPECIALIZATION ……..

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)**	Subject objectives***	Program content***	Teaching tool number***
PEK_W01 (knowledge)	K1INF_W11	C1,C3	Lec 1 – Lec 15	N1, N2, N3
PEK_W02	K1INF_W12	C1, C2	Lec 1 – Lec 15	N1, N2, N3
PEK_W03	K1INF_W14	C1, C3	Lec 1 – Lec 15	N1, N2, N3
PEK_U01 (skills)	K1INF_U05	C2	Lab 1 – Lab 15	N2, N4, N5
PEK_U02	K1INF_U06	C2	Lab 1 – Lab 15	N2, N4, N5
PEK_U03	K1INF_U08	C2	Lab 1 – Lab 15	N2, N4, N5
PEK_U04	K1INF_U11	C1, C2, C3	Lec 1 – Lec 15 Lab 1 – Lab 15	N1, N2, N3, N4, N5
PEK_K01 (competences)	K1INF_K01	C1, C2, C3	Lec 1 – Lec 15 Lab 1 – Lab 15	N1, N2, N3, N4, N5
PEK_K02	K1INF_K04	C1, C2, C3	Lec 1 – Lec 15 Lab 1 – Lab 15	N1, N2, N3, N4, N5

** - enter symbols for main-field-of-study/specialization educational effects
*** - from table above