

(faculty stamp)

COURSE DESCRIPTION

Z1-PU7

WYDANIE N1

Strona 1 z 3

1. Course title: COMPUTER NETWORKS II		2. Course code		
3. Validity of course description: 2012/2013				
4. Level of studies: 1 st cycle of higher education				
5. Mode of studies: intramural studies				
6. Field of study: COMPUTER SCIENCE		(FACULTY SYMBOL) RAU		
7. Profile of studies: ogólnoakademicki				
8. Programme: wszystkie specjalności				
9. Semester: 5				
10. Faculty teaching the course: Institute of Computer Science				
11. Course instructor: Mirosław Skrzewski				
12. Course classification: przedmioty wspólne				
13. Course status: compulsory				
14. Language of instruction: English				
15. Pre-requisite qualifications: introduction to computer science, basics of digital data transmission systems				
16. Course objectives: The aim of the course is to familiarize students with the basic principles of the communication protocols design and the construction and operation of computer networks. The solutions of the data link layer, network and transport layer protocols will be discussed in details, as well as the basic functions of higher layer protocols of the ISO model. Finally, the basic rules for the implementation of core services of Internet network, like dns., email, web will be presented.				
17. Description of learning outcomes:				
Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	Student possesses basic knowledge of flow control methods and algorithms link layer communication protocols use to ensure reliable data transmission over unreliable channels.	Written exam, tests on laboratory exercises	Lectures, Lab exercises	
2.	Student possesses detailed knowledge relating to configuration of computer's IP addressing, IP connections with the physical address and methods of verification	Written exam, tests on laboratory exercises	Lectures, Lab exercises	
3.	Student possesses a basic knowledge about principles of computer networks operation, modes of network operation and methods of route determination for network packets.	Written exam, tests on laboratory exercises	Lectures, Lab exercises	
4.	Student knows the main rules of operation of network transport protocols, algorithms of congestion avoidance and methods of controlling quality of service	Written exam, tests on laboratory exercises	Lectures, Lab exercises	
5.	Student possesses a basic knowledge of algorithms, protocols, and standards relating to the operation of typical network services (network names translation, e-mail, web services).	Written exam, tests on laboratory exercises	Lectures, Lab exercises	
6.	Student knows and understands the basic mechanisms of system configuration protocols on a local area network.	Written exam, tests on laboratory exercises	Lectures, Lab exercises	
7.				
8.				
18. Teaching modes and hours				
Lecture / BA /MA Seminar / Class / Project / Laboratory				
15 h. lecture, 15 h laboratory				

19. Syllabus description:**Lecture:**

Problems of information exchange between computers, the concept of the transmission channel, the communication protocol, algorithms of reliable transmission, the form of information processing, networks services. The logical architecture of computer networks, the ISO OSI reference model, the division of tasks into layers, layer functions, communication (interface) between layers, layer data units, layer services, service delivery models, addressing.

Physical layer functions, tasks of link layer, characters oriented protocols, bit oriented protocols, the methods of obtaining reliable transmission in the presence of interference, modem protocols. Local area network channels, the problem of media access, classification of media access algorithms, CSMA protocols, token based protocols, media allocation protocols. LAN infrastructure, network management, VLAN networks.

Network of transmission channels, modes of operation, the network topology, the tasks of the network layer, network addressing, route selection algorithms, mechanisms of adaptation to changes in topology and load on the network. Protocols Distance Vector, Link State, hierarchical routing, examples of protocols (RIP, OSPF, BGP), cooperation of networks of different organization of transmission .

Transport of information, organization of transmission, addressing, synchronization of network endpoints. Connection oriented, connectionless communication, quality of service (QoS). The problem of interruptions in transmission, the tasks of the session layer, session state registration , recovery algorithms. Processing the form and structure of the information, the notation ASN-1, the problem of information security.

Examples of the wide area network architectures - XNS, Internet (TCP / IP). Structure and function of protocols, network addressing, auxiliary protocols (DNS, ARP, ICMP), transport layer algorithms. LAN architecture - the NetBIOS protocol, the principles of addressing, the SMB protocol.

Network operating systems, client-server systems, peer-to-peer networks, addressing access to services, safety. Unix communication services, rpc, ftp, telnet, smtp, http. Windows, NetBEUI, network environment, mapping drives, shared network resources (folders, printers), the system of access rights.

Laboratory:

Laboratory exercises presents the basic issues related to communication in computer networks, the rules of their configuration and network performance monitoring tools available at network operating systems. In various exercises, students will configure and test the operation of the different network protocols and services using them:

- Principles of communication in IP networks
- Application Programming Interface of TCP/IP stack
- Translation services of system names
- WAN routing protocols
- Local network infrastructure
- Windows Network Environment

20. Examination: yes**21. Primary sources:**

A. Tanenbaum, *Computer Networks*,

W. Stallings, *Data and Computer Communications*, Prentice-Hall Int.

Kurose J., Ross K., *Computer Networking: A top-down approach*.

D. Comer, *Internetworking with TCP/IP, Vol. I: Principles, Protocols, and Architecture*.

22. Secondary sources:

Douglas E. Comer, *Sieci komputerowe i intersieci*. Helion, 2011

Haugdahl S., *Diagnozowanie i utrzymanie sieci. Księga eksperta*, Helion 2001

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	30/30
2	Classes	/
3	Laboratory	30/30
4	Project	/
5	BA/ MA Seminar	/
6	Other	/
	Total number of hours	/

24. Total hours: 120**25. Number of ECTS credits: 2****26. Number of ECTS credits allocated for contact hours: 2****27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 2****26. Comments:**

Approved:

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(date, Instructor's signature)

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(date, the Director of the Faculty Unit signature)

