Obuda University John von Neumann Faculty of Informatics		Institute for Cyber-physical Systems		
Name and code: *Computer Networks (NIXSH0EBNE)*			**Credits*:* 4**	
Computer Science and Engineering BSc specialty			*2022/23 year II. semester*	
Subject lecturers: Ernő Rigó				
Prerequisites (with code):	Basics of information systems (NAIBI0SENE)			
Weekly hours:	Lecture: 2	Seminar.: 0	Lab. hours: 2	Consultation: 0
Way of assessment:	Midterm tests, written exam			

Course description:

Goal: The course covers the basics of computer networks with emphasis on the Internet. Students are introduced to networks' architectural and functional principles, essential terminology, working methods and layered approach of the reference models. They get to know the operating model of the TCP/IP protocol stack, the architecture of the Internet, its hierarchical addressing system, the functioning of protocols ensuring basic Internet services. Other areas of coverage include the main functioning methods of computer networks, their opportunities for use, performance characteristics and specifics of application. Students also familiarize themselves with the physical data transfer environment of computer networks, the methods and characteristics of their use and some details of operation.

Course description: Network reference models, Internet basics, Internet's hierarchical addressing method, domain name system (DNS), IP protocol, basic ideas of packet switching and routing, concepts of connectionless and connection full data transfer, transport protocols and their performance, wired and wireless local area networks, basics of Ethernet.

Lecture schedule

Education week	*Topic*
1.	History and standards, protocols and layering, Internet services and communication paradigms, client-server model, Application protocols
2.	Internet concept and architecture, Internet addressing
3.	Internet protocol packets (datagrams), Datagram forwarding, Address resolution
4.	Basic routing algorithms
5.	Introduction to transport layer protocols (UDP, TCP)
6.	Foundations of Data Communications – Information sources and signals, Transmission media, reliability and channel coding, Transmission modes, modulation and multiplexing
7.	Network Technologies – Access technologies, Interconnection, LANs and Media Access
8.	Network Technologies – Wired and Wireless Technologies, Switched Networks, VLANs
9.	Holiday
10.	Holiday
11.	Internetworking – Firewalls, Address translation, IPv6, VPNs
12.	Infrastructure protocols – DHCP, DNS, Application protocols – HTTP, SMTP, Secure protocols – SSL/TLS, IPSec, SSH

13.	Other topics – Measuring network performance, Quality of service, multimedia and IP telephony, Network security, Traffic engineering, network management
14.	Consultation

Midterm requirements

Two tests during the semester on the lab practices. Both tests have be written and at least 50% has to be achieved. At least one has to be above 50% for the student to qualify for a replacement test. Lab practice tests yield the signature.
Apart from the tests each student must hold a presentation on a networking topic. The details, topics and schedules will be presented at the first lecture.

Education week	Topic
5.	Network packet analysis - Wireshark
13.	Network infrastructure planning - Cisco Packet Tracer

Final grade calculation methods

Final mark is calculated as follows:
0.6*Test Average + 0.4 * Exam

Achieved result	Grade
89%-100%	excellent (5)
76%-88<%	good (4)
63%-75<%	average (3)
51%-62<%	satisfactory (2)
0%-50<%	failed (1)

Type of exam

Written exam.

Type of replacement

One time on the 14th week

References

Obligatory:
- Andrew S. Tanenbaum: Computer Networks – 5th Edition
Prentice Hall, Indian International Ed.; 5th edition (ISBN 9332518742)

Recommended:
- IBM Redbooks: TCP/IP Tutorial and Technical Overview
http://www.redbooks.ibm.com/redbooks.nsf/RedbookAbstracts/gg243376.html
- Charles M. Kozierok: The TCP/IP Guide
http://www.tcpipguide.com/free
- Connected: An Internet Encyclopedia
http://www.freesoft.org/CIE/
- W. Richard Stevens: TCP/IP Illustrated, Volume 1 The Protocols
Addison Wesley Longman, Inc. 1994 (ISBN 0-201-63346-9)
- Eric A. Hall: Internet Core Protocols: The Definitive Guide
O'Reilly & Associates, Inc. 2000 (ISBN 1-56592-572-6)