

<b>Cyber-physical Systems Institute</b>			Semester 2. of the curriculum 2025-26-2			
Name of the subject:	Code of the subject:	Credits:	Weekly hours:			
				lec	sem	lab
<b>Network Technologies</b>	NKXHT1EMLF	4	part-time	10	0	10
Responsible person for the subject: Dr. Eszter Balázsné Kail			Classification: senior lecturer			
Subject lecturer(s): Imre Géczy						
Prerequisites:						
Way of the assessment: exam						
<b>Course description</b>						
Goal:	The aim of the course is to introduce students to the world of networks, familiarise them with the basic characteristics and possible uses of network devices and transmission media, which form the basis of IT systems.					
Course description:	The course presents modern local and wide area network (LAN, WAN) technologies, their transmission media, and the physical and logical topologies of networks. Based on the OSI system model, it describes the internal structure and services of communication systems, the related protocols from the TCP/IP model, the purpose and operation of the relevant protocols and interfaces, the theoretical possibilities for their implementation, and typical practices. It provides more detailed knowledge of the basic operational (switching, routing) and network security solutions (administrative protection of devices, traffic filtering, address translation) affecting large enterprise networks, and also covers the task and implementation models of service quality.					

<b>Lecture schedule</b>	
Education week	Topic
1.	EA: Introduction to requirements, formation and development of networks LA: Introduction to the requirements system, introduction to basic network knowledge using the WireShark application
2.	EA: Network standards, standardisation organisations, models LA: Traffic analysis and filtering using the WireShark application
3.	EA: Physical components and properties of networks, switching processes, principles of operation on a local network LA: Cisco IOS management via command line interface
4.	EA: Addressing systems and their relationship LA: Management of switches and virtual LANs
5.	EA: Routing principles for internal and external networks LA: Subnetting, use of variable length subnet masks (VLSM)
6.	EA: Link-state routing protocols, the OSPF protocol LA: Static routing and inter VLAN routing
7.	EA: Transport layer protocols LA: Dynamic routing and large network management
8.	EA: Structure and operation of the Internet and its services LA: Network implementation of server services (DNS, DHCP, TFTP)
9.	EA: Emergence and development of network security LA: Basics of traffic filtering (ACL) and network address translation (NAT-PAT)
10.	EA: Cancelled due to TDK LA: Advanced traffic filtering (Ex. TDK)
11.	Rector's break

12.	EA: Brief introduction to network storage systems LA: Complex problem solving				
13.	EA: New trends in the world of networks (IPv6, IoT devices) LA: End of term practical exam				
14.	EA: Network design and implementation principles at small and medium-sized enterprise level LA: Supplementary/Corrective end of term practical exam				
<b>Mid-term requirements</b>					
Conditions for obtaining a mid-term grade/signature	The condition for obtaining a signature is that the student's absences do not exceed the percentage specified in the HKR. The condition for admission to the examination is obtaining a signature, which can be achieved by writing a midterm exam held during the laboratory exercises with at least a pass result. The maximum number of points that can be obtained on the end of term exam is 100. The end of term exam is considered pass if the score achieved is at least 50.				
<b>Assessment schedule</b>					
<b>Education week</b>	<b>Topic</b>				
<b>13.</b>	End of term practical exam				
<b>14.</b>	Supplementary/Corrective end of term practical exam				
<b>Method used to calculate the <i>mid-term grade</i> (to be filled out only for subjects with mid-term grades)</b>					
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<b>Type of the replacement</b>					
Type of the replacement of written test/mid-term grade/signature	Midterm exams not taken or failed in week 13 may be retaken during the study period in week 14.  A signature must be retaken if the results of the midterm exam and the supplementary/corrective midterm exam written during the semester in the laboratory exercises are failed. The signature can be retaken at a separately specified time, on one of the first 10 working days of the examination period, during a signature retake exam.				
<b>Type of the exam (to be filled out only for subjects with exams)</b>					
A written examination, which may include questions from both the lecture material and the theoretical material covered in the laboratory sessions.  The examination lasts 90 minutes, and a calculator may be used as an aid for calculation tasks.					
<b>Calculation of the exam mark (to be filled only for subjects with exams)</b>					
The final grade for the semester is based on the average of the marks obtained in the laboratory tests and the exam, according to the following formula:  Subject result = 0.5 * Practical end of term result (%) + 0.5 * Exam result (%)					
<b>Final grade calculation methods:</b>					
The final grade will be calculated using the following scale:					
<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Achieved result</td> <td>Grade</td> </tr> <tr> <td>86% - 100%</td> <td>excellent (5)</td> </tr> </table>		Achieved result	Grade	86% - 100%	excellent (5)
Achieved result	Grade				
86% - 100%	excellent (5)				

	74%- 85%	good (4)	
	62% -73%	satisfactory (3)	
	50% - 61%	pass (2)	
	0 - 49 %	failed (1)	
References			
Obligatory:	<ul style="list-style-type: none"> <li>- Tiszai T.: Computer Networks – brief notes (PDF file)</li> <li>- Andrew S. Tanenbaum: Computer Networks – second, expanded, revised edition Prentice Hall – Panem 2004. (ISBN 963-545-384-1)</li> <li>- Petrényi József: TCP/IP Basics Volume I – <a href="http://mek.oszk.hu/08300/08374/">http://mek.oszk.hu/08300/08374/</a></li> </ul>		
Recommended:	<ul style="list-style-type: none"> <li>- IBM Redbooks: TCP/IP Tutorial and Technical Overview <a href="http://www.redbooks.ibm.com/redbooks.nsf/RedbookAbstracts/gg243376.html">http://www.redbooks.ibm.com/redbooks.nsf/RedbookAbstracts/gg243376.html</a></li> <li>- Charles M. Kozierok: The TCP/IP Guide (Online version) <a href="http://www.tcpipguide.com/free">http://www.tcpipguide.com/free</a></li> <li>- Connected: An Internet Encyclopaedia (online version) <a href="http://www.freesoft.org/CIE/">http://www.freesoft.org/CIE/</a></li> <li>- Stephen A. Thomas: IP Switching and Routing, Kiskapu Ltd. 2002. (ISBN 963-9301-41-8)</li> <li>- W. Richard Stevens: TCP/IP Illustrated, Volume 1 The Protocols Addison Wesley Longman, Inc. 1994 (ISBN 0-201-63346-9)</li> <li>- Eric A. Hall: Internet Core Protocols: The Definitive Guide O'Reilly &amp; Associates, Inc. 2000 (ISBN 1-56592-572-6)</li> <li>- József Petrényi: TCP/IP Basics Volume II. <a href="http://mek.oszk.hu/08300/08374/">http://mek.oszk.hu/08300/08374/</a></li> </ul>		
Other references:	See Moodle system.		