



SYLLABUS

Basic information of the course	
University:	University “Ukshin Hoti” - Prizren
Academic unit:	Faculty of Computer Science
Study program:	Information Technologies and Telecommunication
Course:	TCP/IP Technology
Study level:	Bachelor
Course status:	Mandatory
Study year:	2
Number of hours per week:	2+2
Credit value - ECTS:	6
Time / location:	It will be published in the university web site!
Lecturers:	Assoc.Prof.Dr. Malush Mjaku Ass. PhD.C. Betim Maloku
Contact details:	malush.mjaku@uni-prizren.com betim.maloku@uni-prizren.com
Course description:	This course presents basic networking technology and terminology, including the ISO/OSI Network Reference Model, DoD networking model, IP addressing and name resolution, and other concepts and information relevant to setting up and using TCP/IP-based networks. The course demonstrates the use of Ethereal, an open source protocol analyzer, to help readers understand how those protocols and services work, while also exploring the operation and message sequences for all key data-link, network, and transport layer protocols.
Course objectives:	The purpose of this course is to give students general knowledge about the main elements of networks, standards, products and problems that have the role in building and operating a network. Moreover, it will give an overview of the various computer networks and network technologies. It will give the explanation about the TCP/IP protocols and the comparison with the OSI reference model. A detailed explication of IP addressing, IP subnet, and IP routing will be realized. The theoretical part will be combined with numerical

	and practical examples of subnetation of computer networks and configuration of network devices (Switches and Routers).		
Learning outcomes:	After this course, the student is expected to gain sufficient knowledge about: key network elements, standards, products, and problems affecting the construction and operation of a network; WAN and backbone networks; various computer networks and network technologies. The student should gain sufficient knowledge of TCP/IP protocols and should be able to make the difference between the TCP/IP protocol and the OSI reference model. The student should have good knowledge about the subnetation of computer networks, as well as the basics of addressing, commutation and routing. Further, it is expected that after completing this course the student will be able to gain basic knowledge of the configuration of the network devices (Switch, Router).		
Contribution on student load (must correspond with learning outcomes)			
Activity	Hours	Days/week	Total/hours
Lectures	2	15	30
Exercise theoretical/laboratory	2	15	30
Practice work	-	-	-
Contact with lecturer/consultations	0.5	15	3
Field exercises	-	-	-
Midterms	-	-	-
Laboratory exercises	-	-	-
Individual time spent studying (at the library or home)	4	15	60
Final preparation for the exam	5	2	10
Time spent in evaluation (tests, quiz, final exam)	1	2	2
Projects, presentations, etc.	1	15	15
Total			150
Notice: 1 ECTS credits = 25 hours commitment, e.g. if the course has 6 ECTS credits student must have 150 hours during the semester.			
Teaching methods:	The course is a combination of lectures, discussions, numerical and laboratory exercises, while the assignments are presented by the laboratory course lecturers!		

Assessment methods:	<ul style="list-style-type: none"> - Seminar work: 10%. - Midterm 1: 45%. - Midterm 2 2: 45%. - Or Final Exam: 100%. 	
Assessment and grading:	Vlerësimi në %	Nota përfundimtare
	91% - 100%	10
	81% - 90%	9
	71% - 80%	8
	61% - 70%	7
	51% - 60%	6
	0% - 50%	5
Literature		
Basic literature:	<ol style="list-style-type: none"> 1. Lecture Notes. 2. Todd Lammle; Network +; Deluxe Study Guide, 2009. 3. Shivendra S. Panwar, Shiwen Mao, Jeong-dong Ryoo dhe Yihan Li; TCP/IP Essentials, Cambridge University, 2004. 	
Additional literature:	1.	
Study plan		
Week	Lectures	
<i>First week:</i>	<ul style="list-style-type: none"> • CHAPTER I – Communication Networks: Introduction; Network card; Computer configuration for network connection; Types of network configuration. 	
<i>Second week:</i>	<ul style="list-style-type: none"> • CHAPTER I - Communication Networks: Local Area Network (LAN); LAN network topologies (bus, star, ring, tree, mesh); Devices used in the LAN network topology; Modems DSL; ADSL; VHDSL; Wireless Access Points (WAP); firewall; Dynamic Host Configuration Protocol (DHCP) server; Standardized model layers - OSI. 	
<i>Third week:</i>	<ul style="list-style-type: none"> • CHAPTER II - Optical Networks: Introduction; SONET synchronous optical network; Advantages of SONET; Transmission Hierarchy in SONET; SONET Framework Structure; Synchronous digital SDH hierarchy; Advantages of SDH; SDH Framework Structure; SONET / SDH. 	
<i>Fourth week:</i>	<ul style="list-style-type: none"> • CHAPTER III - Central TCP / IP protocols: Introduction; Architecture, history, standards and trends; TCP/IP protocol; Internet network; TCP/IP protocol layers; TCP/IP applications; Client / server model. 	

<i>Fifth week:</i>	<ul style="list-style-type: none"> CHAPTER IV - IP Addressing: Introduction; IP addresses; IP Address Classes; Reserved IP addresses; Special use of IP addresses; IP subnets; Subnet masks; Types of subnetting (class-full and class-less).
<i>Sixth week:</i>	<ul style="list-style-type: none"> CHAPTER IV - IP Addressing: Subnetting of class C addresses; Practical examples of subnetting: Addresses of class C Subnetting of class B addresses; Practical examples of subnetting: Class B addresses; Subnetting Class A addresses; Practical examples of subnetting: Class A addresses
<i>Seventh week:</i>	<ul style="list-style-type: none"> The first test
<i>Eighth week:</i>	<ul style="list-style-type: none"> CHAPTER V - IP Routing: Introduction; IP routing process (packet creation, route tracking, route receipt, etc.); Routing Basics; Understanding of IP routing; Static and Dynamic Routing.
<i>Ninth week:</i>	<ul style="list-style-type: none"> CHAPTER VI - IP Routing Protocols: Introduction; Basics of routing protocol; Administrative distance; Routing protocols classes; Vector distance routing protocols; RIP version 1; RIP Version 2; VLSM and separate networks; EIGRP; Border Gateway Protocol.
<i>Tenth week:</i>	<ul style="list-style-type: none"> CHAPTER VI - IP Routing Protocols: Link-State Routing Protocols; Open Shortest Path First (OSPF); Intermediate System to Intermediate System (IS-IS).
<i>Eleventh week:</i>	<ul style="list-style-type: none"> CHAPTER VII - TCP/IP Protocols: Introduction; Application Layer Protocols (Telnet, FTP, SFTP, TFTP, NFS, SMTP, POP, IMAP 4, TLS, SIP (VoIP), RTP (VoIP), SNMP
<i>Twelfth week:</i>	<ul style="list-style-type: none"> CHAPTER VII - TCP/IP Protocols: HTTP; HTTPS; IGMP; DNS; Dynamic Host Configuration Protocol (DHCP)/Bootstrap Protocol (BootP); Protocollet e shtrësës Host-to- Host; Internet Control Message Protocol (ICMP); Address Resolution Protocol (ARP); Reverse Address Resolution Protocol (RARP); Proxy Address Resolution Protocol (Proxy ARP).
<i>Thirteenth week:</i>	<ul style="list-style-type: none"> CHAPTER VIII - IPv6: Introduction; The problem with IPv4; Internet Protocol, version 6; Format of IPv6; Examples of IPv6; Configuring IPv4 and IPv6; The main commands for testing and network management (ping, telnet, ipconfig, ipconfig / all, tracert, nslookup, etc.
<i>Fourteenth week:</i>	<ul style="list-style-type: none"> CHAPTER IX - Switch and Router Configuration: Commands and configuration procedures for

	switches and routers.
<i>Fifteenth week:</i>	<ul style="list-style-type: none"> • The second test

Exercises

Study plan	
Java	Exercises
<i>First week:</i>	<ul style="list-style-type: none"> • Introduction; Network Elements.
<i>Second week:</i>	<ul style="list-style-type: none"> • Presentation of the Cisco Packet tracer software tool for simulation of computer networks; Lab exercises through Cisco Packet Tracer software: - Creation of network topology for configuration; -Preparation and connecting computers in the network (configuration of IP addresses);
<i>Third week:</i>	<ul style="list-style-type: none"> • Lab exercises through Cisco Packet Tracer software: Basic Configurations of Switches and Routers on network topology (configuration of passwords).
<i>Fourth week:</i>	<ul style="list-style-type: none"> • Lab exercises through Cisco Packet Tracer software: Console and telnet configuration (Configuration of passwords and practical testing of operation after configuration).
<i>Fifth week:</i>	<ul style="list-style-type: none"> • Numerical exercises: Subnetting IP addresses and subnet masks..
<i>Sixth week:</i>	<ul style="list-style-type: none"> • Numerical exercises: IP address classes, subnetting and wildcard mask.
<i>Seventh week:</i>	<ul style="list-style-type: none"> • The first laboratory test
<i>Eighth week:</i>	<ul style="list-style-type: none"> • Lab exercises through Cisco Packet Tracer software: - Configuration of default route and static routes.
<i>Ninth week:</i>	<ul style="list-style-type: none"> • Lab exercises through Cisco Packet Tracer software: - Configuration of RIPv1 and RIPv2 protocols. - Configuration of EIGRP protocol.
<i>Tenth week:</i>	<ul style="list-style-type: none"> • Lab exercises through Cisco Packet Tracer software: - Configuration of OSPF and IS-IS protocols.
<i>Eleventh week:</i>	<ul style="list-style-type: none"> • Laboratory exercises through Cisco Packet Tracer software and Wireshark: - Configuration and capture of network packets of servers, services, and protocols: FTP, SFTP, TFTP, NFS, and SMTP.
<i>Twelfth week:</i>	<ul style="list-style-type: none"> • Laboratory exercises through Cisco Packet Tracer software and Wireshark: - Configuration and capture of network packets of servers, services, and protocols: POP, IMAP 4, TLS, SIP (VoIP), RTP(VoIP), dhe SNMP.
<i>Thirteenth week:</i>	<ul style="list-style-type: none"> • Laboratory exercises through Cisco Packet Tracer software and Wireshark: - Configuration and capture of network packets of servers, services, and

	protocols: HTTP, HTTPS, IGMP, DNS, DHCP, BootP, ICMP, ARP, RARP, Proxy ARP.
<i>Fourteenth week:</i>	<ul style="list-style-type: none"> Numerical exercises and laboratory exercises through Cisco Packet Tracer software: IPv6 and IPv6 configuration in the existing topology.
<i>Fifteenth week:</i>	<ul style="list-style-type: none"> The second laboratory test

Academic policies and rules of conduct	
<ul style="list-style-type: none"> Generally lecture presentations will be made through MS PowerPoint, tables, material usage, computer programs and numeric exercises. Additional resources (scientific papers, publications, national bulletins, as well as recent discoveries and research) will be provided by professors. In the absence of the opportunity for practical work to be organized weekly, in cooperation with the management of the university, this activity will be organized on certain days in: organizations, companies, etc. During each session will be organized the conversation and co-participation with the students! Students are required to be regular in lectures and exercises! It will be evaluated when the students collaborate and participate in the lectures and course exercises! Timely arrival in lectures and exercises is mandatory! 	