

Course title	Introduction to Networking and Wireless Communications
Course code	InfT1039
Scientific field	18.-information technologies
Credit value	2
ECTS	3
Total number of hours (contact hours)	32
Number of hours for practice	16
Course author(s)	
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Course annotation	
The aim of the course: is to provide the students knowledge about fundamentals of data transmission through the networks and its particularities, as well give to students understanding of the network architectures, models and protocols. Teach them network terminology, provide skills for basic configuration of the network devices and using the command line interface (CLI), test a small computer network. Describe the architecture, components, and operations of routers and switches in a small network. Provide an understanding of switching processes, VLAN technology, and routing. Learn how to configure a router and a switch for basic functionality.	
Learning outcomes	
<i>On successful completion of the course, student will be able to:</i>	
<ul style="list-style-type: none"> • Understand fundamentals of data transmission through the networks and its particularities; • Understand and describe the devices and services used to support communications in data networks and the Internet; • Understand and describe the role of protocol layers in data networks; • Understand and describe the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments; • Understand subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks; • Explain fundamental Ethernet concepts such as media, services, and operations; • Build a simple Ethernet network using routers and switches; • Use Cisco command-line interface (CLI) commands to perform basic router and switch configurations; • Utilize common network utilities to verify small network operations and analyze data traffic; • Understand and describe basic switching concepts and the operation of Cisco switches; • Understand and describe enhanced switching technologies such as VLANs, VLAN Trunking Protocol (VTP), Rapid Spanning Tree Protocol (RSTP), Per VLAN Spanning Tree Protocol (PVSTP), and 802.1q; • Understand and describe the purpose, nature, and operations of a router, routing tables, and the route lookup process; • Configure and verify static routing and default routing; • Understand and describe how VLANs create logically separate networks and how routing occurs between them; • Understand and describe dynamic routing protocols, distance vector routing protocols, and link-state routing protocols; • Configure and troubleshoot basic operations of routers in a small routed network: <ul style="list-style-type: none"> ○ Routing Information Protocol (RIPv1 and RIPv2); ○ Open Shortest Path First (OSPF) protocol (single-area OSPF); • Understand and describe the purpose and types of access control lists (ACLs); • Understand and describe the operations and benefits of Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) for IPv4 and IPv6; • Understand and describe the operations and benefits of Network Address Translation (NAT); 	
Course plan	
Course structure:	

1. Fundamentals of data transmission through the networks and its particularities (signals, frequency, bandwidth, etc.) (4h)
2. Exploring the Network (1h)
3. Configuring a Network Operating System (2h)
4. Network Protocols and Communications (2h)
5. Network Access (1h)
6. Ethernet (1h)
7. Network Layer (1h)
8. Transport Layer (2h)
9. IP Addressing (IPv4 and IPv6) (1h)
10. Subnetting IP Networks (1h)
11. Application Layer (2h)
12. Basic Switching Concepts and Configuration (2h)
13. Routing Concepts (1h)
14. Inter-VLAN Routing (2h)
15. Static Routing (2h)
16. Routing Dynamically (2h)
17. Single-Area OSPF (2h)
18. Access Control Lists (2h)
19. DHCP (1h)

Independent studies:

Additional self-reading materials will be provided to students on each topic, also on-line tests will be used as self-assessment tool.

Requirements to obtain credit points

The final grade is calculated as follows:

- activity in the classroom – 10%
- homework – 25%
- on-line assessments – 10%
- on-line assessment PT Practice SBA – 15%
- main test – 40%

Covered topics

1. Fundamentals of data transmission through the networks and its particularities
2. Exploring the Network
3. Configuring a Network Operating System
4. Network Protocols and Communications
5. Network Access
6. Ethernet
7. Network Layer
8. Transport Layer
9. IP Addressing (IPv4 and IPv6)
10. Subnetting IP Networks
11. Application Layer
12. Basic Switching Concepts and Configuration
13. Routing Concepts
14. Inter-VLAN Routing
15. Static Routing
16. Routing Dynamically
17. Single-Area OSPF
18. Access Control Lists
19. DHCP

Main references

1. J. F. Kurose, K. W. Ross. Computer Networking: A Top-Down Approach. Pearson, 7th edition, 2016. - 864 p.
2. Cisco Networking Academy. Introduction to Networks v6 Companion Guide. Cisco Press, 1st edition, 2016.- 604 p.
3. Cisco Networking Academy. Introduction to Networks v6 Labs & Study Guide (Lab Companion). Cisco Press, 1st edition, 2016.- 672 p.
4. Cisco Networking Academy. Routing and Switching Essentials v6 Companion Guide. Cisco Press, 1st edition, 2016.- 640 p.
5. Cisco Networking Academy. Routing and Switching Essentials v6 Labs & Study Guide (Lab Companion). Cisco Press, 1st edition, 2016.- 544 p.

Additional references

1. D. E. Comer. Computer Networks and Internets. Pearson; 6th edition, 2014.-672 p.
2. W. Goralski. The Illustrated Network: How TCP/IP Works in a Modern Network. Morgan Kaufmann, 2nd edition, 2017.-936.

Other references

1. <http://www.cisco.com>

Notes

- The labs will be delivered in TTI CISCO Networking laboratory