

Faculty: FACULTY OF TELECOMMUNICATIONS AND MANAGEMENT
Department: INFORMATION TECHNOLOGIES
Professional Field: 5.3 COMMUNICATION AND COMPUTER TECHNOLOGY
Specialty: Cyber security of high technologies
Educational-qualification degree: PROFESSIONAL BACHELOR

LEARNING COURSE DESCRIPTION

1.Course title: Networks and Protocols 2

2.Course code: P.18.028.1

3.Type of the course: compulsory

4.Level: professional bachelor

5.Year of study: 2

6.Semester: 4

7.Number of credits: 6

8.Name of the lecturer: Assoc. Prof. Dr. Eng. Irina Topalova, Assoc. Prof. Dr. Eng. Pavlinka Radoyska

9.Course learning outcomes:

The aim of the course is to acquaint students with the basic functionalities of network devices for switching and routing IPv4 / IPv6 traffic, as well as with the methods and protocols for their implementation. Students gain systematic theoretical knowledge of the peculiarities of IPv4 / IPv6 traffic switching, the types of routing, segmentation of IP traffic via VLANs, translation of NAT / PAT network addresses, traffic filtering through access control lists ACLs, and practical skills for applying these methods in real network topologies. Practical skills for working with the Cisco Systems simulator - Packet Tracer, as well as with Catalyst 2950/60 network devices and Cisco 800, 1700, 2600, 2800 series routers are mastered. Students who have completed their training in the course must acquire:

Basic knowledge of the specifics, functionality, design, implementation and troubleshooting of modern network topologies.

Practical skills for working with network devices, configuring and testing the functionality of designed network topologies. Acquiring skills to work with software simulators and real devices, to configure and troubleshoot network topologies.

Competencies: Upon successful completion of the course, students should be able to:

- to explain concepts related to the functioning of modern IPv4 / IPv6 networks;
- to design the structure and functional parameters of computer networks;
- to segment IP traffic via VLANs;
- translate NAT / PAT network addresses;
- filter IP traffic using standard access control lists (ACLs);
- to apply practical skills for building these methods in real network topologies;
- to work with software packages Packet Tracer, GNS, Wireshark, etc.

10.Teaching methods:

The lectures are conducted by acquainting the students with the material provided in the curriculum. The lectures are illustrated with graphic and video material, with illustrative examples and tasks, which are presented through presentations with a multimedia projector.

The practical exercises are conducted in the laboratories of the department, equipped with modern computers and network devices, and each student works independently.

Before each practical session, students are informed about the need for preliminary training on the topic.

11. Prerequisites:

Students should have in-depth knowledge in the field of Computer Architectures, Fundamentals of Information Technology, Networks and Protocols 1.

12. Course contents:

Principles of routing, static and dynamic routing, principles of operation of switches and construction of virtual local area networks (VLANs), types of VLANs and their configuration, methods of protection of switches ports, STP protocol, Basic principles of ACL, DHCP protocol, Nat protocol.

13. Bibliography

Basic literature:

1. IP Routing: RIP Configuration Guide, Cisco IOS Release 15M&T, Cisco Systems, Inc. 170 West Tasman Drive San Jose, CA 95134-1706 USA <http://www.cisco.com>, 2018.
2. Chris Jackson, Hank A. A. Preston, Steve Wasko, "CCNA Cloud CLDADM 210-455 Official Cert Guide Premium Edition and Practice Test", ISBN-13: 978-0-13-430556-1, 2017.
3. Tim Szigeti, David Zacks, Matthias Falkner, Simone Arena, "Cisco Digital Network Architecture: Intent-based Networking for the Enterprise", ISBN-13: 978-1-58714-705-0, 2018.
4. Wendell Odom, "CCNA Routing and Switching 200-125 Official Cert Guide Library", ISBN-13: 978-1-58720-581-1, 2017.
5. Sean Wilkins, Wendell Odom, "CCNA Routing and Switching 200-125 Network Simulator", Pearson uCertify Academic Edition Student Access Card, ISBN-13: 978-0-7897-5778-4, 2017.

Additional literature:

1. Narbik Kocharians, CCIE Routing and Switching v5.1 Foundations: Bridging the Gap Between CCNP and CCIE, ISBN-13: 978-1-58714-472-1, 2017.
2. Jeff Doyle, Jennifer DeHaven Carroll, "Routing TCP/IP, Volume 1 (2nd Edition)", ISBN 13: 978-1587052026, 2005.
3. Packet Tracer Software Package v7.1.1. www.netacad.com, 2018.
4. <https://www.cisco.com/c/en/us/support/docs/security/ios-firewall/23602-confaccesslists.html>, 2019.
5. https://www.wireshark.org/docs/wsug_html_chunked/k, 2019

14. Assessment methods and criteria:

The course ends with an exam.

The assessment is formed as follows:

When learning through the netacad.com platform

$Grade [\%] = 0,1 \cdot \sum (Chapter\ test [\%]) + 0,4 \cdot (Skill\ Exam [\%]) + 0,5 \cdot (Final\ Exam [\%])$

When training outside the netacad.com platform

Three ongoing tests are conducted during the semester,

$Grade [\%] = 0,1 \cdot \sum (semester\ tests [\%]) + 0,4 \cdot (skill\ exam [\%]) + 0,5 \cdot (theoretical\ exam [\%])$

The formation of an assessment in the training course at each of the indicated stages, according to the received points and their arrangement according to the six-point system is given in Table 1.

Table 1.

Number of points	Assessment According to the 6-pointScale System
0 – 10	Fail 2 (F)
11 – 29	Fail 2 (FX)
30 – 34	Satisfactory 3.00 (E)
35 – 49	Satisfactory 3.00 (D)
50 – 64	Good 4.00 (C)
65 – 79	Very good 5.00 (B)
over 80 %	Excellent 6.00 (A)

15. Language of instruction: Bulgarian/English