

Faculty: FACULTY OF TELECOMMUNICATIONS AND MANAGEMENT
Department: INFORMATION TECHNOLOGIES
Professional Field: 5.3 COMMUNICATION AND COMPUTER TECHNOLOGY
Specialty: CYBER SECURITY OF COMMUNICATION TECHNOLOGIES
Educational-qualification degree: BACHELOR

LEARNING COURSE DESCRIPTION

1.Course title: Networks and Protocols 1

2.Course code: B.43.018.1

3.Type of the course: compulsory

4.Level: bachelor

5.Year of study: 2

6.Semester: 3

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 "Networks and Protocols 1" is to acquaint students with the theoretical and practical functional aspects of IP-based networks and the relevant types of communication protocols. The subject of the course is: acquisition of knowledge about the functional features of local (LAN) and geographically remote computer networks (WAN), as well as the relevant communication network protocols. In practical terms, the course includes mastering the basic rules of IP network communication. Students get acquainted with the OSI model, as well as with the corresponding TCP / IP protocol stack. The main elements and functional features of the network operating system - IOS, the classes of IP networks and their division into subnets are studied. Students get acquainted with the network protocols working on the respective layer in the TCP / IP model, as well as with the data format. Acquire knowledge and skills for designing IP networks, for detecting and troubleshooting specific network topologies.

Students who have completed their training in the course must acquire:

Basic knowledge of the functional features of local area networks (LAN), as well as the operation of network protocols at the appropriate levels in the TCP / IP model.

Practical skills for configuring and working with different network devices connected in appropriate topologies to test the set functionality. Acquiring skills to work with a software simulator 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 IP networks;
- to design the structure and functional parameters of computer networks;
- select and configure correctly set network protocols;
- to configure the basic configurations of network devices;
- successfully find and troubleshoot topologies with real network devices;
- to work with software packages Packet Tracer, 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 Fundamentals of Electrical Engineering, Fundamentals of Electronics, Operating Systems, Fundamentals of Programming and others.

12. Course contents:

The course covers the types of networks and topologies, characteristics of the layers of the OSI model, physical and logical addressing. The operation of the Ethernet, ARP, IPv4, IPv6, ICMP, TCP, UDP, Telnet, SSH, DNS protocols, the principles of operation of the protocols related to e-mail, Web services and file transfer are considered in a similar way. The principles of operation of network routers and switches are discussed. Commands for configuring routers and switches are being studied.

13. Bibliography

Basic literature:

1. D.K. Academy, Компютърни мрежи - наръчник на системния администратор, ISBN: 9786197356502, Асеновци, 2018
2. 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.
3. Andrew S. Tanenbaum, "Computer Networks (5th Edition)", ISBN-13: 978-0132126953, 2017.
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. Sam Halabi, "Internet Routing Architectures (2nd Edition) 2nd Edition", ISBN-13: 978-1578702336, 2006.
2. 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.
3. Packet Tracer Software Package v7.1.1. www.netacad.com, 2018.
4. Narbik Kocharians, CCIE Routing and Switching v5.1 Foundations: Bridging the Gap Between CCNP and CCIE, ISBN-13: 978-1-58714-472-1, 2017.
5. 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.
6. Jeff Doyle, Jennifer DeHaven Carroll, "Routing TCP/IP, Volume 1 (2nd Edition)", ISBN 13: 978-1587052026, 2005.

14. Assessment methods and criteria:

The course ends with an exam.

Grades in the course are formed on the basis of a points system and the maximum number of points that students can receive is 60. They are formed by the following activities:

First test during the semester - 20 points;

Second test during the semester - 20 points;

Successful solving of practical tasks during the exercises - 20 points.

The discipline tests consist of closed questions, with four to six possible answers, of which only one or two are correct. Forming an assessment in the training course at each of the above stages, according to the points obtained and their ranking according to the six-point system is given in Table 1.

Table 1.

Number of points	Assessment According to the 6-point Scale System
0 – 10	Fail 2 (F)
11 – 20	Fail 2 (FX)
21 – 26	Satisfactory 3.00 (E)
27 – 31	Satisfactory 3.00 (D)
32 – 40	Good 4.00 (C)
41 – 48	Very good 5.00 (B)
49 – 60	Excellent 6.00 (A)

15. Language of instruction: Bulgarian