UNIVERSITY OF ECONOMICS - VARNA

FACULTY OF INFORMATICS

DEPARTMENT OF INFORMATICS

Adopted by the FC (record № 9/24.04.2024)
Adopted by the DC (record № 10/16.04.2024)

ACCEPTED BY:
Dean:
(Prof. Vladimir Sulov, PhD)

SYLLABUS

SUBJECT: COMPUTER NETWORKS

DEGREE PROGRAMME: Computer Science; MASTER`S DEGREE

YEAR OF STUDY: 6 for other field graduates; SEMESTER: 11 for other field graduates

TOTAL STUDENT WORKLOAD: 210 hours; incl. curricular 60 hours

CREDITS: 7

DISTRIBUTION OF STUDENT WORKLOAD ACCORDING TO THE CURRICULUM

TYPE OF STUDY HOURS	**WORKLOAD, hours**	**TEACHING HOURS PER WEEK, hours**
CURRICULAR: incl. • LECTURES • SEMINARS / LAB. EXERCISES	 30 30	 2 2
EXTRACURRICULAR	150	-

Prepared by:

1. **……..**
(Prof. Julian Vasilev, PhD)

2. **……**
(Chief Assist. Prof. Mihail Radev, PhD)

Head of department of Informatics: ……
(Prof. Julian Vasilev, PhD)

I. ANNOTATION

The course "Computer Networks" aims to form basic knowledge of computer networks and their usage in the modern Network economy. The course provides the necessary knowledge of the structure, principles of operation and construction of networks. The laboratory exercises are performed on real network equipment, which allows students to develop practical skills.

The acquired knowledge is a foundation for future specialized courses in the field of computer science and a prerequisite for the development and implementation of modern information systems in all business areas.

In the course of training, the following key competencies are applied and developed, according to the recommendation of the Council of the European Union dated May 22, 2018, namely:

• Mathematical competence and competence in the field of exact sciences, technologies, and engineering - Students should be able to apply in practice the segmentation of networks into subnets and the creation of addressing schemes, as well as apply models to detect and fix critical problems encountered in the operation of computer networks.

• Digital competence - Ability to create, manage and monitor computer networks.

• Civil competence - Ability to work in team in the process of creating, cabelling or setting computer networks; ability to solve problems; ability to listen to colleagues and discuss professionally IT solutions.

II. THEMATIC CONTENT

№	TITLE OF UNIT AND SUBTOPICS	NUMBER OF HOURS		
		L	S	L.E.
Theme 1. COMPUTER NETWORKS – BASIC CONCEPTS		**3**	**3**	
1.1.	Network protocols.			
1.2.	Network addressing.			
Theme 2. NETWORK PROTOCOLS AND COMMUNICATIONS		**3**	**3**	
2.1.	Protocols, protocol suites and standards.			
2.2.	Reference models.			
Theme 3. NETWORK ACCESS		**3**	**3**	
3.1.	Physical layer protocols.			
3.2.	Network media.			
Theme 4. IPV4 ADDRESSING		**6**	**6**	
4.1.	Subnetting an IPv4. Basic VLSM.			
4.2.	Calculating the subnets. Testing the network layer.			
Theme 5. IPV6 ADDRESSING		**6**	**6**	
5.1.	IPv6 packet. IPv6 addressing.			
5.2.	Types of IPv6 addresses.			
Theme 6. TRANSPORT OSI LAYER		**3**	**3**	
6.1	The TCP protocols. Managing TCP sessions.			
6.2	The UDP protocol.			
Theme 7. APPLICATION LAYER		**3**	**3**	

7.1	Types of applications and services.			
7.2	Application layer protocols.			
Theme 8. PLANNING AND CABLING NETWORK		**3**	**3**	
8.1	Developing a network project. Network security. Developing an addressing scheme.			
8.2	Device interconnections. Measurement of productivity.			
	Total:	**30**	**30**	

III. FORMS OF CONTROL:

№	TYPE AND FORM OF CONTROL	Number	extracurricular, hours
1.	**Midterm control**		
1.1.	Preparation and defense of case study 1 on computer networks and their basic concepts	1	30
1.2.	Preparation and defense of case study 2 on network protocols	1	30
1.3.	Preparation and defense of case study 3 on network access commands	1	30
	Total midterm control:	**3**	**90**
2.	**Final term control**		
2.1.	Examination - Preparation and defense of case study 4 on intermediate networking tasks	1	30
2.2.	Examination - Preparation and defense of case study 5 on advanced networking tasks	1	30
	Total final term control:	**2**	**60**
	Total for all types of control:	**5**	**150**

IV. LITERATURE

REQUIRED (BASIC) LITERATURE:

1. Kurose, J., Ross, K., Computer Networking A Top-Down Approach, 8th Edition, Pearson, 2022
2. Cisco Networking Academy, Introduction to Networks Companion Guide (CCNAv7), Pearson, 2020
3. Johnson, A., Cisco Networking Academy, Introduction to Networks Labs and Study Guide (CCNAv7) (Lab Companion), Cisco Press, 2020

RECOMMENDED (ADDITIONAL) LITERATURE:

1. Computer Networking Bible: [3 in 1] The Complete Crash Course to Effectively Design, Implement and Manage Networks. Including Sections on Security, Performance and Scalability, 2023.
2. Lammle, T., CompTIA Network+ Study Guide 5th Edition, Sybex, 2021.
3. Lammle, T., Understanding Cisco Networking Technologies, Volume 1, Sybex, 2019