

### DESCRIPTION OF THE STUDY SUBJECT

**Title**

<b>COMPUTER NETWORKS AND TELECOMMUNICATIONS</b>
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**Scope of the subject**

Semester	Mode of studies	Structure*					Total number of hours	Number of credits	Group and type of subjects
		L	Lw	C	CP	S			
IV	Full-time	16	37	12	13	88	166	6	Compulsory subjects of the study field
V	Part-time	8	22	42	6	88	166	6	

\*L – lectures, PS – practical activities, seminars, LW – laboratory work, PR – practice, CP – course paper, C – consultations, S – self-study

**Aim of the subject**

To understand processes taking place in computer networks, to be able to configure hardware of the network, to adjust the network using TCP / IP and other protocols, to know how to administer the network, access to resources in different operating systems, to ensure its safety and to diagnose faults and eliminate their causes, to have knowledge of telecommunication networks.
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**Necessary background knowledge for studying the subject**

Students shall have heard the subjects computer graphics, computer hardware, operating systems management.
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**Content of the subject**

Title of the topic and description of the content	Number of contact hours					Total number of hours
	L	Lw	CP	C	S	
1. Computer network, its concept, data transmission principles. Computer network topologies, network equipment.	3	-	-	-	-	<b>3</b>
2. Local and global networking technologies. Wireless networks. The OSI model. IEEE 802 standards. TCP / IP and other protocol kits. Cables and connectors.	3	-	-	-	-	<b>3</b>
Laboratory work. • Designing, testing of the local computer network.	-	4	-	1	4	<b>9</b>
3. Telecommunications networks, technological solutions. Communication protocols. New generation transmission systems.	2	-	-	-	-	<b>2</b>
Laboratory work. • Designing, testing of the telecommunications network.	-	3	-	1	4	<b>8</b>
<b>Preparation for the defence of laboratory works and their defence No.1.</b>	-	2	-	-	6	<b>8</b>
4. Network operating systems.	2	-	-	-	-	<b>2</b>
Laboratory works: • Adjustment and testing of the network in the Windows environment; • Adjustment and testing of the network in the Linux / Unix environment.	-	6	-	2	6	<b>14</b>
5. The concept of routing in computer networks, network services, cloud computing.	2	-	-	-	-	<b>2</b>
Laboratory works: • The analysis of the routing table in Windows / Linux / Unix operating systems, virtual networks services; • Installation and management of the data exchange assurance service in the local network in Windows / Linux / Unix operating systems.	-	8	-	2	12	<b>22</b>
<b>Preparation for the defence of laboratory works and their defence No. 2</b>	-	2	-	-	8	<b>10</b>
6. Network security assurance solutions, monitoring and analysis of the network.	2	-	-	-	-	<b>2</b>
Laboratory works: • Monitoring and analysis of network packets; • Firewall management in Windows / Linux / Unix operating system.	-	7	-	2	12	<b>21</b>
7. Designing and administration of the network.	2	-	-	-	-	<b>2</b>
Laboratory work. • Network administration in Windows / Linux / Unix operating system.	-	3	-	1	9	<b>13</b>
<b>Preparation for the defence of laboratory works and their defence</b>	-	2	-	-	7	<b>9</b>

Title of the topic and description of the content	Number of contact hours				S	Total number of hours
	L	Lw	CP	C		
<b>No. 3</b>						
<b>Term paper.</b> To prepare a term paper on computer networks according to the modelled situation, in which it is required to perform a comprehensive analysis of topologies, connection techniques, architecture, cables, to draw the logical network diagram, to describe hardware and software implementation of the network, to create the model of the installed network in the network emulation program.	-	-	13	3	20	<b>36</b>
<b>Total number of hours</b>	<b>16</b>	<b>37</b>	<b>13</b>	<b>12</b>	<b>88</b>	<b>166</b>

#### Assessment of learning outcomes

Ten-point criteria-based assessment system as well as cumulative assessment using individual cumulative index (ICI) are applied. The overall grade is the sum of grades for defence of laboratory works (DLw) and term paper (TP) multiplied by weighted coefficients.

$$ICI = 0,2 DLw1 + 0,2 DLw2 + 0,2 DLw3 + 0,4 TP$$

#### Recommended literature

Key literature						
No.	Year of publishing	Author(s) and title of the publication	Publishing house	Number of copies and/or internet link		
				ŠSSC library	Other premises	Other libraries *
1.	2015	Mažeika D. Kompiuterių tinklai. Paskaitų medžiaga.	VG TU DMA	<a href="http://dma.vgtu.lt/tinklai.html">http://dma.vgtu.lt/tinklai.html</a>		
2.	2008	Plėštys R., Rimkus D., Lagzdinytė I., Sarafinienė N. Tinklų sauga	Technologija	<a href="https://www.ebooks.ktu.lt/eb/432/tinklų_sauga/">https://www.ebooks.ktu.lt/eb/432/tinklų_sauga/</a>		
3.	2008	Plėštys R., Rimkus D., Lagzdinytė I., Sarafinienė N. Kompiuterių tinklų sauga	Technologija	<a href="https://www.ebooks.ktu.lt/eb/428/kompiuteriu_tinklų_sauga/">https://www.ebooks.ktu.lt/eb/428/kompiuteriu_tinklų_sauga/</a>		
4.	2008	Garla E. Kompiuterių tinklų projektavimas	Ciklonas	4	-	18
Additional literature						
No.	Year of publishing	Author(s) and title of the publication	Publishing house and/or internet link			
1.	2015	Ubuntu Lietuvoje	<a href="http://www.ubuntu.lt/">http://www.ubuntu.lt/</a>			
2.	2015	Microsoft wizards	<a href="https://msdn.microsoft.com/en-us/library/bb165646.aspx">https://msdn.microsoft.com/en-us/library/bb165646.aspx</a>			
3.	2011	Tanenbaum A.S. Computer networks	D.J. Wetherall. Boston: Pearson			
4.	2007	Valterytė R. Kompiuterių tinklai	Vytauto Didžiojo universitetas			
5.	2005, 2003	Kaklauskas L. Kompiuterių tinklai 1, 2 dalys	Šiaulių universiteto leidykla			
6.	2001	NetworkingResources	<a href="http://www.comptechdoc.org/independent/networking/">http://www.comptechdoc.org/independent/networking/</a>			

\* ŠAVB – Šiauliai Region Povilas Višinskis Public Library, ŠU – library of Šiauliai University

#### Required material resources and their short description

- **Equipment (devices):** computers (16 pcs.), computers connected to a local network and connected to the Internet, multimedia projector, hard disk drives (16 pcs., not less than 500GB), RAM (16 pcs., not less than 4 GB), routers (16 pc. ), network cable, network sockets (16 pcs.), network installation pliers, testers, installation tools.
- **Software:** Windows 10, 8.1, 7 or another, Linux, Unix operating families distributions.

#### The description prepared by:

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