Discipline	Internet Servers and Services code: 34 summer semester
Specialty	SOFTWARE AND INTERNET TECHNOLOGIES
ECTS credits: **5**	Form of assessment: Examination
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Department	SOFTWARE AND INTERNET TECHNOLOGIES
Faculty	Faculty of Computer Sciences and Automation

Annotation: The course "Internet Servers and Services" aims to introduce the students to the principles of modern Internet services. Knowledge about the features of the most widely used services, such as DNS, DHCP, NAT, Web Services, e-mail are given. Particular attention is paid to the problems associated with network attacks and the protection of network communications as well as the implementation of firewall and VPN infrastructures. There are also issues related to virtual infrastructures and cloud computing and services.

Learning objectives:

- Internet Architecture. Basic concepts. Organizations (IANA). Standards (RFC). Client-server model. Access to Internet services.
- Server Operating Systems. OS Linux. Microsoft Windows Server OS. Administering services.
- Autonomous systems. Routing between autonomous systems. BGP routing protocol.
- Dynamic device configuration. Architecture. DHCP servers and clients. DHCP processes and interaction.
- Translating Internet Addresses (NAT). Static NAT. Dynamic NAT.
- Domain name system (DNS). Basic concepts. Host names. Resolving addresses into names. Alternative naming services (HOSTS.TXT, WINS, NIS).
- DNS Servers. BIND DNS. Zones and resource records. Master and slave servers. Caching. Forwarding. Subdomains. DNS security. Dynamic DNS.
- Remote access to services. Remote Access Architecture. TELNET. Remote login. SSH, SSL.
- Remote Access. PPP protocol. PPPoE protocol. Remote Desktop Protocol.
- Virtual private networks (VPNs). Concepts and solutions. VPN of the types client-network and network-network. VPN implementation - tools and devices.
- Web Architecture. Web servers and clients. HTTP protocol. HTTP proxies.

- Apache Web Server. Architecture. Configuration.
- E-mail. Architecture. SMTP protocol. Mail servers. Transport agents. POP and IMAP protocols.
- Virtualization. Virtual Infrastructures. Virtualization platforms (Oracle VirtualBox, Microsoft Hyper-V, VMware ESXi, Xen).

Cloud Services. Cloud infrastructures. Cloud business models (IaaS, PaaS, SaaS).

CONTENTS:

Training Area	Hours lectures	Hours seminar exercises
Topic 1. Architecture of the Internet. Basic concepts. Organizations (IANA). Standards (RFC). Client-server model. Access to Internet services.	2	
Topic 2. Server Operating Systems. OS Linux. OS Microsoft Windows Server. Administration of services.	2	
Topic 3. Autonomous systems. Routing among autonomous systems. BGP routing protocol.	2	
Topic 4. Dynamic Device Configuration. Architecture. DHCP servers and clients. DHCP processes and interaction.	2	
Topic 5. Network Address Translation (NAT). Static NAT. Dynamic NAT.	2	
Topic 6. Domain name system (DNS). Basic concepts. Machine names. Translation of addresses into names. Alternative naming services (HOSTS.TXT, WINS, NIS).	2	
Topic 7. DNS Servers. BIND DNS. Zones and resource records. Main and subordinate servers. Caching. Forwarding. DNS subdomains. DNS security. Dynamic DNS.	2	
Topic 8. Remote access to services. Remote Access Architecture. TELNET. Remote login. SSH, SSL.	2	
Topic 9. Realizing of Remote Access. PPP protocol. PPPoE protocol. Remote Desktop Protocol.	2	
Topic 10. Virtual private networks (VPNs). Concepts and solutions. VPN of the type Network -Client, Network-Network. VPN implementation - tools and devices.	2	
Topic 11. Web Architecture. Web servers and clients. HTTP protocol. HTTP proxies.	2	
Topic 12. Apache Web Server. Architecture. Configuration	2	

Topic 13. E-mail. Architecture. SMTP protocol. Mail servers. Mail Transport agents. POP and IMAP protocols.	2	
Topic 14. Virtualization. Virtual Infrastructures. Virtualization platforms (Oracle VirtualBox, Microsoft Virtual PC, VMWare, Xen).	2	
Topic 15. Cloud services. Cloud infrastructures. Cloud business models (IaaS,PaaS,SaaS)	2	
Topic 1. OS Linux. Basic commands. Configuring the Communication Subsystem.		2
Topic2. OS Microsoft Windows Server. Administrative Tools - Microsoft management console. Configure server role.		2
Topic3. Build a routed network		2
Topic 4. Routing via BGP protocol		2
Topic 5. Configuring of DNS server. Cach server. Access to root DNS servers.		2
Topic 6. Build DNS infrastructure with subdomains.		2
Topic 7. Organizing of remote access to services. TELNET, SSH		2
Topic 8. Realizing remote access based on PPP protocol.		2
Topic 9. Build a VPN infrastructure of the client-network type		2
Topic 10. Building a network-based VPN infrastructure.		2
Topic 11. Configuring the Apache web server.		2
Topic 12. Implementation of web infrastructure. HTTP Proxy SQUID.		2
Topic 13. Implementation of an e-mail system.		2
Topic 14. Installing and Configuring Virtual Machines.		2
Topic 15. Building a network infrastructure.		2
TOTAL: 60 h	**30**	**30**