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| The title of the course | Computer Networks I |
| Faculty | Faculty of Mechanical Engineering and ComputerScience |
| The level of studies | Undergraduate (BA) |
| Semester | Winter |
| The form of classes and number of hours | Lectures (15) and self-directed learning laboratories (30) |
| Language of instruction | English |
| The number of ECTS | 3 |
| Teacher | PhD Ruslana Ziubina |
| The aims of the course (maximum 500 characters) | The aim of Computer Networks Part 1 is to provide foundational knowledge and skills in networking. It covers essential concepts such as network fundamentals, LAN switching technologies, routing technologies, infrastructure services, and infrastructure maintenance. The course prepares students for configuring, managing, and troubleshooting basic network devices and introduces IPv4 and IPv6 protocols. It is designed to equip learners with the critical skills required for entry-level networking positions and to lay the groundwork for further study in networking. |
| The content of the course: main topics and key ideas | 1. Introduction to Computer Networks

- Overview of network components and architectures- Understanding the OSI and TCP/IP models1. Configuration of a Network Operating System (IOS)

- Initial setup and configuration of routers and switches- Basic command-line interface (CLI) commands1. Network Protocols and Communications

- TCP/IP protocol suite- Common network protocols and their functions1. Physical and Network Access Layers

- Physical components and media types- Data link layer functions and MAC addressing1. Ethernet

- Ethernet standards and technologies- Operation of switches and switching concepts1. Network Layer

- Basic routing concepts and operations- Static and dynamic routing (RIP)1. IP Addressing and Subnetting (IPv4 and IPv6)

- Subnetting and IP addressing- Configuring and troubleshooting IPv4 and IPv6 addresses1. ARP Protocol

- Address Resolution Protocol (ARP) functionality- ARP process in network communication1. Transport and Application Layers

 - TCP and UDP protocols - Common application layer protocols and client-server models1. Basics of Network Security and Troubleshooting

 - Implementing basic security measures on network devices - Detecting and troubleshooting network problems using management tools |
| Didactics methods | Lectures and Presentations, Interactive Simulations |
| Course requirements | Computer Laboratory for self-directed learning |
| Literature (basic and supplementary) | 1. Wendell Odom, "CCNA 200-301 Official Cert Guide Library," Cisco Press, 2020.
2. Todd Lammle, "CCNA: Cisco Certified Network Associate Study Guide," Wiley, 2020.
3. Cisco Networking Academy, "CCNA 1: Introduction to Networks v7 Companion Guide," Cisco Press, 2020.
4. Richard Deal, "CCNA Cloud Complete Study Guide: Exam 210-451 and Exam 210-455," Sybex, 2016.
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| The effects of the education - knowledge - skills - social competences | Knowledge:The student systematically learns networking concepts, including network architectures, protocols, and models. The student understands the configuration and management of network devices using Cisco IOS and has structured knowledge in IP addressing, subnetting (IPv4 and IPv6), routing protocols, and network security fundamentals.Skills:The student develops the ability to configure and troubleshoot network devices such as routers and switches. He has become proficient in using network simulation tools and command-line interfaces and can identify and resolve network issues, ensuring the stability and efficiency of network operations. Social Competences:The student learns to work effectively in a team to design and implement network solutions and demonstrates the ability to communicate technical information clearly and effectively to peers and non-technical stakeholders. They can set strategic and operational goals for network projects, prioritize tasks, and manage time efficiently. Moreover, the student shows responsibility for maintain |