

COMPUTER NETWORKING



This course provides a comprehensive introduction to computer networking, focusing on the fundamental concepts, protocols, and technologies essential for building and maintaining networks. Students will explore networking devices, IP addressing, network configuration, wireless networking, security practices, and troubleshooting techniques. Hands-on labs and practical activities will reinforce theoretical knowledge, preparing students for real-world networking challenges.

COURSE OBJECTIVES

- To introduce students to various networking devices and their functions.
- To develop skills in IP addressing and subnetting for effective network management.
- To teach the setup and security of both wired and wireless networks.
- To equip students with troubleshooting techniques for diagnosing and resolving network issues.
- To familiarize students with network simulation software for designing and testing network topologies.

LEARNING OUTCOMES

Upon successful completion of this course, students will be able to:

1. **Identify Networking Devices:** Recognize and describe the functions of routers, switches, and hubs.
2. **Configure Devices:** Successfully configure networking devices, including switches and routers, in a lab environment.

3. **Implement IP Addressing:** Calculate and implement IP addressing and subnetting plans to create efficient network segments.
4. **Set Up Networks:** Establish a local area network (LAN), assigning both static and dynamic IP addresses as needed.
5. **Secure Wireless Networks:** Research and implement security measures for wireless networks, including Wi-Fi standards and configuration of wireless routers.
6. **Understand Network Protocols:** Utilize network protocols effectively, employing packet sniffing tools to analyze traffic and data flow.
7. **Apply Network Security:** Discuss common security threats and implement firewall rules to protect network integrity.
8. **Troubleshoot Networking Issues:** Apply troubleshooting techniques and commands to diagnose and resolve connectivity issues in various scenarios.
9. **Use Simulation Software:** Design and simulate network topologies using network simulation software, enhancing understanding of network design and functionality.

COURSE TOPICS

1. Networking Devices
2. IP Addressing and Subnetting
3. Network Configuration
4. Wireless Networking
5. Network Protocols
6. Network Security
7. Troubleshooting Techniques
8. Network Simulation Software

Learning Objectives

1. Configure networking devices.
2. Implement IP addressing and subnetting.
3. Set up and secure wireless networks.
4. Troubleshoot networking issues.
5. Use network simulation software.

Key Topics and Activities

1. **Networking Devices**
 - Identify routers, switches, and hubs.
 - **Lab:** Configure a switch and router.
2. **IP Addressing and Subnetting**
 - Calculate subnets.
 - **Lab:** Implement a subnet plan.
3. **Network Configuration**
 - Set up a local area network (LAN).
 - **Lab:** Assign static and dynamic IP addresses.
4. **Wireless Networking**
 - Research Wi-Fi standards and security.
 - **Lab:** Configure a wireless router.
5. **Network Protocols**
 - Use packet sniffing tools.
 - **Lab:** Set up a web server.
6. **Network Security**
 - Discuss security threats.
 - **Lab:** Implement firewall rules.
7. **Troubleshooting Techniques**
 - Learn troubleshooting commands.
 - **Lab:** Diagnose connectivity issues.
8. **Network Simulation Software**
 - Introduction to simulation tools.
 - **Lab:** Design a network topology.