



Department of Teaching & Learning
Parent/Student Course Information

CISCO Networking Engineering II
(AT6658)
Three Credits, One Year
Grades 9 - 12

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.

COURSE DESCRIPTION

In this two-year program, students develop skills in designing, installing, configuring, operating and troubleshooting simple and complex computer networks. The courses include topics in network architecture, industry standards, communication protocols, networking devices (routers and switches), router programming, media selection, topologies, data transmission and cabling for LANs and WANs.

CERTIFICATION

Cisco Certified Network Associate certification (CCNA)

STUDENT ORGANIZATION

SkillsUSA is a co-curricular organization for all students enrolled in trade and industrial education programs. SkillsUSA is a partnership of students, teachers and industry working together to ensure America has a skilled workforce. SkillsUSA helps students excel by providing educational programs, events and competitions that support career and technical education (CTE) in the nation's classrooms. Students are highly encouraged to participate.

PREREQUISITE

Cisco Network Engineering I

OPTIONS FOR NEXT COURSE

None

REQUIRED STUDENT TEXTBOOK

None

COMPETENCIES FOR CISCO NETWORK ENGINEERING II

Demonstrating Workplace Readiness Skills: Personal Qualities and People Skills

- 1 Demonstrate positive work ethic.
- 2 Demonstrate integrity.
- 3 Demonstrate teamwork skills.
- 4 Demonstrate self-representation skills.
- 5 Demonstrate diversity awareness.
- 6 Demonstrate conflict-resolution skills.
- 7 Demonstrate creativity and resourcefulness.

Demonstrating Workplace Readiness Skills: Professional Knowledge and Skills

- 8 Demonstrate effective speaking and listening skills.
- 9 Demonstrate effective reading and writing skills.
- 10 Demonstrate critical-thinking and problem-solving skills.
- 11 Demonstrate healthy behaviors and safety skills.
- 12 Demonstrate an understanding of workplace organizations, systems, and climates.
- 13 Demonstrate lifelong-learning skills.
- 14 Demonstrate job-acquisition and advancement skills.
- 15 Demonstrate time-, task-, and resource-management skills.
- 16 Demonstrate job-specific mathematics skills.
- 17 Demonstrate customer-service skills.

Demonstrating Workplace Readiness Skills: Technology Knowledge and Skills

- 18 Demonstrate proficiency with technologies common to a specific occupation.
- 19 Demonstrate information technology skills.
- 20 Demonstrate an understanding of Internet use and security issues.
- 21 Demonstrate telecommunications skills.

Examining All Aspects of an Industry

- 22 Examine aspects of planning within an industry/organization.
- 23 Examine aspects of management within an industry/organization.
- 24 Examine aspects of financial responsibility within an industry/organization.
- 25 Examine technical and production skills required of workers within an industry/organization.
- 26 Examine principles of technology that underlie an industry/organization.
- 27 Examine labor issues related to an industry/organization.
- 28 Examine community issues related to an industry/organization.
- 29 Examine health, safety, and environmental issues related to an industry/organization.

Addressing Elements of Student Life

- 30 Identify the purposes and goals of the student organization.
- 31 Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.
- 32 Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects.
- 33 Identify Internet safety issues and procedures for complying with acceptable use standards.

Exploring Routing Concepts

- 34 Describe the primary functions and features of a router.
- 35 Identify router components.
- 36 Use traceroute to discover the network.
- 37 Map the Internet.
- 38 Enable Internet protocol (IP) on a switch.
- 39 Document an addressing scheme.
- 40 Document the network.
- 41 Configure basic router settings.

- 42 Configure an IPv4 router interface.
- 43 Configure an IPv6 router interface.
- 44 Configure IPv4 and IPv6 interfaces.
- 45 Verify interface settings.
- 46 Filter show command output.
- 47 Use command history feature.
- 48 Configure and verify a small network.
- 49 Configure basic router settings with IOS CLI.
- 50 Match layer 2 and layer 3 addressing.
- 51 Order the steps in the packet-forwarding process.
- 52 Interpret the content of a routing table.
- 53 Directly connect.
- 54 Investigate directly connected routes.
- 55 Describe static routes.
- 56 Describe three types of routes that are populated in a routing table.

Static Routing

- 57 Identify the advantages and disadvantages of static routing.
- 58 Identify the type of static route.
- 59 Configure a next-hop static route.
- 60 Configure a directly connected static route.
- 61 Configure a fully specified static route.
- 62 Configure IPv4 static and default routes.
- 63 Configure IPv4 static and default routes in hands-on lab.
- 64 Explain the IPv6 route command.
- 65 Configure a next-hop static IPv6 route.
- 66 Configure a directly connected static IPv6 route.
- 67 Configure a fully specified static IPv6 route.
- 68 Configure IPv6 static and default routes.
- 69 Configure and verify an IPv4 floating static route.
- 70 Configure floating static routes.
- 71 Troubleshoot static routes.
- 72 Troubleshoot static routes in a hands-on lab.
- 73 Design and implement a variable-length subnet mask (VLSM) addressing scheme.
- 74 Design and implement IPv4 addressing with VLSM.
- 75 Determine the summary network address and prefix.
- 76 Configure IPv4 route summarization in two scenarios.
- 77 Configure IPv6 route summarization.
- 78 Calculate summary routes with IPv4 and IPv6.
- 79 Configure a floating static route.

Examining Dynamic Routing

- 80 Explain the operation of dynamic routing protocols.
- 81 Compare static and dynamic routing.
- 82 Advertise appropriate networks.
- 83 Enable RIP routing.
- 84 Disable auto summarization.
- 85 Propagate a default route.
- 86 Configure basic RIPv2.
- 87 Identify parts of an IPv4 routing table entry.
- 88 Identify parent and child IPv4 routes.
- 89 Determine the longest match route.
- 90 Identify parts of an IPv6 routing table entry.

91 Analyze a routing table.

Working with Switched Networks

92 Explain various ways data is sent and received.

93 Identify switched network terminology.

94 Identify switch hardware.

95 Identify frame forwarding methods.

96 Determine how a switch forwards a frame.

97 Determine broadcast and collision domains.

98 Describe switch features.

Configuring Switches

99 Explain the difference between unicast, multicast, and broadcast packets.

100 Configure basic switch setting.

101 Configure switch ports at the physical layer.

102 Configure SSH.

103 Configure switch port security.

104 Troubleshoot switch port security.

105 Configure switch security features.

106 Implement Layer 5 configuration.

107 Configure various switch settings.

108 Identify common security attacks.

Exploring VLANs

109 Identify the purpose of VLANs.

110 Identify broadcast traffic.

111 Predict switch behavior.

112 Investigate a VLAN implementation.

113 Create a VLAN.

114 Assign ports to VLANs.

115 Change VLAN port membership.

116 Verify VLAN information.

117 Configure VLANs.

118 Verify trunk configuration

119 Configure trunks.

120 Configure VLANs and trunks.

121 Troubleshoot a VLAN implementation.

122 Troubleshoot VLAN configurations.

123 Identify the types of inter-VLAN routing.

124 Configure per-interface inter-VLAN routing.

125 Configure router-on-a-stick sub interfaces.

126 Configure router-on-a-stick inter-VLAN routing.

127 Configure 802.1Q routing.

128 Configure inter-VLAN routing.

129 Explain data forwarding.

130 Integrate VLAN skills.

131 Negotiate interface modes.

132 Troubleshoot a VLAN implementation in two scenarios.

133 Troubleshoot VLAN configurations in a hands-on lab.

134 Configure the PVLAN edge feature.

135 Identify the VLAN attacks.

136 Implement VLAN security.

137 Implement a VLAN.

138 Demonstrate various VLAN skills.

Using Access Control Lists

- 139 Demonstrate the use of ACL.
- 140 Determine the correct wildcard mask.
- 141 Determine the permit or deny control.
- 142 Configure ACL statements.
- 143 Configure standard ACLs.
- 144 Configure numbered standard IPv4 ACLs.
- 145 Configure and modify standard IPv4 ACLs.
- 146 Use the access-class command.
- 147 Configure an ACL on VTY lines.
- 148 Configure and verify VTY restrictions.
- 149 Troubleshoot standard IPv4 ACLs.
- 150 Control FTP access.
- 151 Demonstrate ACL skills.

Exploring Dynamic Host Configuration Protocol (DHCP)

- 152 Identify the steps in DHCPv4 operation.
- 153 Configure a basic DHCPv4 server.
- 154 Configure DHCPv4 relay commands.
- 155 Configure basic DHCPv4 on a router in a hands-on lab.
- 156 Configure basic DHCPv4 on a switch in a hands-on lab.
- 157 Configure a router as a DHCPv4 client.
- 158 Configure DHCPv4 using Cisco IOS.
- 159 Troubleshoot DHCPv4 in a hands-on lab.
- 160 Identify the steps in DHCPv6 operation.
- 161 Verify stateless DHCPv6.
- 162 Verify stateful DHCPv6.
- 163 Configure a router as a DHCPv6 relay agent.
- 164 Configure stateless and stateful DHCPv6 in a hands-on lab.
- 165 Troubleshoot DHCPv6 in a hands-on lab.
- 166 Configure Internet of Everything (IoE) and DHCP.
- 167 Demonstrate DHCP skills.

Exploring Network Address Translation for IPv4

- 168 Identify NAT terminology.
- 169 Investigate NAT operation.
- 170 Configure static NAT.
- 171 Configure dynamic NAT.
- 172 Configure dynamic and static NAT in a hands-on lab.
- 173 Configure PAT.
- 174 Identify the address information at each hop.
- 175 Implement static and dynamic NAT.
- 176 Configure port address translation (PAT) in a hands-on lab.
- 177 Configure port forwarding on a Linksys router.
- 178 Verify NAT configurations.
- 179 Troubleshoot NAT configurations in a hands-on-lab.
- 180 Check NAT.
- 181 Demonstrate NAT skills.

Discovering Devices

- 182 Map a network using Cisco Discovery Protocol (CDP).
- 183 Compare CDP and Link Layer Discovery Protocol (LLDP).
- 184 Configure CDP and LLDP.
- 185 Configure Network Time Protocol (NTP).

- 186 Configure syslog and NTP.
- 187 Configure syslog and NTP in a hands-on lab.
- 188 Back up and configure files.
- 189 Manage router configuration files with Tera Term in a hands-on lab.
- 190 Manage device configuration files using TFTP, Flash, and USB in a hands-on lab.
- 191 Research password recovery procedures in a hands-on lab.
- 192 Confirm steps to backup IOS image to TFTP server.
- 193 Use a TFTP server to upgrade a Cisco IOS image.
- 194 Demonstrate router licensing skills.
- 195 Demonstrate integration skills.

Aaron C. Spence, Ed.D., Superintendent
Virginia Beach City Public Schools
2512 George Mason Drive, Virginia Beach, VA 23456-0038

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For further information please call (757) 263-1070.

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To seek resolution of grievances resulting from alleged discrimination or to report violations of these policies, please contact the Title VI/Title IX Coordinator/Director of Student Leadership at (757) 263-2020, 1413 Laskin Road, Virginia Beach, Virginia, 23451 (for student complaints) or the Section 504/ADA Coordinator/Chief Human Resources Officer at (757) 263-1133, 2512 George Mason Drive, Municipal Center, Building 6, Virginia Beach, Virginia, 23456 (for employees or other citizens). Concerns about the application of Section 504 of the Rehabilitation Act should be addressed to the Section 504 Coordinator/ Executive Director of Student Support Services at (757) 263-1980, 2512 George Mason Drive, Virginia Beach, Virginia, 23456 or the Section 504 Coordinator at the student's school. For students who are eligible or suspected of being eligible for special education or related services under IDEA, please contact the Office of Programs for Exceptional Children at (757) 263-2400, Laskin Road Annex, 1413 Laskin Road, Virginia Beach, Virginia, 23451.

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CHARTING THE COURSE

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