



Department of Teaching & Learning
Parent/Student Course Information

CISCO Networking Engineering I
(AT6657)
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

None

OPTIONS FOR NEXT COURSE

Cisco Network Engineering II

REQUIRED STUDENT TEXTBOOK

None

COMPETENCIES FOR CISCO NETWORK ENGINEERING I

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 the Network

- 34 Draw your concept of the Internet.
- 35 Research network collaboration tools.
- 36 Identify network component representations and functions.
- 37 Research converged network services.
- 38 Identify network architecture requirements.
- 39 Identify network security terminology.
- 40 Research information technology (IT) and networking career opportunities.

Configuring a Network Operating System

- 41 Describe Cisco IOS operating system.
- 42 Compare access methods.
- 43 Navigate the IOS.
- 44 Establish a console session.
- 45 Configure initial switch settings.
- 46 Demonstrate basic connectivity.
- 47 Design a simple network.
- 48 Configure a switch management address.

Exploring Network Protocols and Communications

- 49 Explain network protocols and standards.
- 50 Identify protocols and layers.
- 51 Research networking standards.
- 52 Illustrate the encapsulation process.

Accessing the Network

- 53 Describe the data-link layer.
- 54 Identify network devices and cabling.
- 55 Identify network media.
- 56 Build an Ethernet crossover cable.
- 57 Determine wired and wireless network interface card (NIC) information.
- 58 Identify frame fields.
- 59 Design physical facility layout.

Examining the Ethernet

- 60 Analyze network device MAC addresses.
- 61 Explain the switch MAC address table.
- 62 Identify MAC and IP addresses.
- 63 Analyze the Address Resolution Protocol (ARP) table.

Examining the Network Layer

- 64 Identify IP characteristics.
- 65 Identify elements of a routing table entry.
- 66 Identify router components.
- 67 Describe Internetworking devices.
- 68 Describe physical characteristics of routers.
- 69 Configure a Cisco router.
- 70 Connect a router to a LAN.
- 71 Troubleshoot default gateway issues.

Setting IP Addresses

- 72 Perform network mathematics.
- 73 Analyze unicast, broadcast, and multicast.
- 74 Identify IPv4 addresses.
- 75 Practice IPv6 address representations.
- 76 Identify types of IPv6 addresses.
- 77 Configure a global unicast address.
- 78 Identify IPv6 addresses.

Subnetting IP Networks

- 79 Calculate the subnet mask (basic).
- 80 Determine number of bits to borrow.
- 81 Calculate IPv4 subnets.
- 82 Demonstrate Variable-length Subnet Masking (VLSM).
- 83 Implement a subnetted IPv6 addressing scheme.

Examining the Transport Layer

- 84 Identify Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) characteristics.
- 85 Identify TCP and UDP traffic.

Examining the Application Layer

- 86 Identify the application and presentation (protocols and standards) layers.
- 87 Research peer-to-peer file sharing.
- 88 Configure Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) servers.
- 89 Describe File Transfer Protocol (FTP).
- 90 Establish a multiuser Packet Tracer connection.

Building a Small Network

- 91 Identify network security threats.
- 92 Examine telnet and SSH in Wireshark.
- 93 Secure network devices.
- 94 Manage device configuration files.
- 95 Demonstrate password recovery procedures.
- 96 Perform network latency test with ping and traceroute.
- 97 Perform show commands.
- 98 Use the CLI to gather network device information.

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

Produced by the Department of Media and Communications for the
Department of Teaching and Learning.
For further information please call (757) 263-1070.

Notice of Non-Discrimination Policy

Virginia Beach City Public Schools does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation/gender identity, pregnancy, childbirth or related medical condition, disability, marital status, age, genetic information or veteran status in its programs and activities and provides equal access to the Boy Scouts and other designated youth groups. School Board policies and regulations (including, but not limited to, Policies 2-33, 4-4, 5-7, 5-19, 5-20, 5-44, 6-7, 6-33, 7-48, 7-49, 7-57 and Regulations 2-33.1, 4-4.1, 4-4.2, 4-4.3, 4-6.1, 5-44.1, 7-11.1, 7-17.1 and 7-57.1) provide equal access to courses, programs, counseling services, physical education and athletic, vocational education, instructional materials and extracurricular activities.

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.

Alternative formats of this publication which may include taped, Braille, or large print materials are available upon request for individuals with disabilities. Call or write The Department of Teaching and Learning, Virginia Beach City Public Schools, 2512 George Mason Drive, P.O. Box 6038, Virginia Beach, VA 23456-0038. Telephone 263-1070 (voice); fax 263-1424; 263-1240 (TDD) or email at Brandon.Martin@vbschools.com.

vbschools.com
your virtual link to Hampton Roads' largest school system



VIRGINIA BEACH CITY PUBLIC SCHOOLS
CHARTING THE COURSE

No part of this publication may be produced or shared in any form without giving specific credit to Virginia Beach City Public Schools.

(Revised August 2018)