

SWEETWATER UNION HIGH SCHOOL DISTRICT
DIVISION OF ADULT EDUCATION
Career Technical Education

Cisco® Certified Network Technician

COURSE APPROVAL

Mission: The Division of Adult Education, a community-focused organization, promotes and facilitates life-long learning for adults to meet the challenges of the 21st century.

Student Learning Outcomes

Students will establish personal, academic and/or workforce goals and demonstrate progress toward them

Students will solve problems

Students will communicate clearly and collaborate with others

Students will use resources, including technology, to research, organize and communicate information

Course approved by the SUHSD Board of Trustees, July 27, 2010

Course Revision

July 23, 2012

May 12, 2014

June 27, 2016

Cisco® Certified Network Technician

Basic Course Information

Course Title:	Cisco® Certified Network Technician						
CTE Industry Sector:	Information Technology						
Career Pathway:	Networking						
Course Level:	X	Introductory		Concentration		Capstone	
Course Number:	0621						
CBEDS Title:	Networking						
CBEDS Number:	4604						
Course Hours:	324 hours						
Articulation Information:	Southwestern College Computer Networking for N+ Certifications ELEC 265 Network Academy Fundamentals (CISCO Cert Prep) CIS142 Routers & Internet Work Fundamentals (CISCO Cert Prep) CIS144A						
Academic Credit:	ELEC 265 – 4 credits CIS 142 – 3 credits CIS 144A – 3 credits						
Advisory Committee Meetings:	Annually						

Course Description

Students gain the skills to become a certified network technician using the Cisco® CCNA® Discovery curriculum is primarily designed for Cisco Networking Academy® students who are seeking entry-level Cisco® Certified Network Technician employment. This course provides general networking theory, practical experience, and opportunities for career exploration and soft-skills development.

Instructional Strategies

Discussion, Video programs, Controlled notes, Individual & group projects, Anatomical charts/models, Textbook/reference reading/Internet.

Instructional Materials

Cisco® Academy Website, Textbooks, Presentation Material

Course Sequence

Sequence of Courses	Course Level			Primary Funding Source		Perkins Funded Yes or No	Total Duration (In hours)
	Intro.	Concentration	Capstone	District/COE	ROCP		
Certified Network Technician - CCNT	X			X		Yes	324

Certified Network Technician II			X	X		Yes	324
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Occupations for Identified Pathway

Pathway occupations organized by level of education and training required for workplace entry. (Asterisked occupations require certification or licensure.)	
Postsecondary Training (certification and/or AA degree)	College University (bachelor's degree or higher)
<ul style="list-style-type: none"> • Cisco® Certified Network Technician (CCNT) • Comptia® Network+ 	<ul style="list-style-type: none"> • Cisco Network Associate • Network Systems Technician • Telecommunications Specialist • Network Engineer • Network Manager/Director

Course Goals

1. Students will gain an introduction to the IT industry as it pertains to Networking.
2. Identify PC hardware components and how they work in a computers system.
3. Understand all aspects of an operating system.
4. Students will gain an introduction to networking.
5. Understand the workings of the internet and connecting through an ISP.
6. Differentiate between different types of IP addresses and understand how they are obtained.
7. Understand Network Services and the interaction between client and servers.
8. Understand wireless technologies and how to configure.
9. Identify threats to operating system and understand how to take preventative measures.
10. Have the skills to troubleshoot a network.

Instructional Module/Unit Networking for Home and Small Businesses

Unit 1	Introduction	Class Hrs.	8	Lab Hrs.	
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Description:

Students gain an introduction to the course and learn class expectations. They are introduced to the common traits exhibited by people successfully working in this field, personal qualifications, interests, aptitudes, and knowledge of skills necessary to succeed this career pathway. Students examine the historical and economic background of this field as well as current opportunities available. In addition students will examine the personal, professional, and educational requirements needed to meet their goals.

Unit 1 Competency: Upon Completion of this unit, the student is able to:

1. Identify the personal qualifications, interests, aptitudes, knowledge and skills of successful **network technicians**.

2. Demonstrate an understanding of personal, professional, ethical, and educational requirements of this career field.

Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.

Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.

Anchor Standard: 3.1 Identify personal interests, aptitudes, information and skills necessary for informed career decision making success.
Anchor Standard: 3.2 Evaluate personal character traits such as trust, respect, and responsibility and understand the impact they can have on career success.
Anchor Standard: 3.4 Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.
Anchor Standard: 3.9 Develop a career plan that reflects career interests, pathways, and postsecondary options.
Pathway: B1.0 Identify and describe the principles of networking and the technologies, models, and protocols used in a network. B1.1-B1.6
Academics: LS 11-12.1 -Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. LS 11-12.5 – Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

Unit 2	Personal Computer Hardware	Class Hrs.	6	Lab Hrs.	3
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Description:

1.0 Unit Introduction 1.1 Personal Computers and Applications 1.2 Types of Computers 1.3 Binary Representation of Data 1.4 Computer Components and Peripherals 1.5 Computer System Components 1.6 Unit Summary
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Unit 2: Upon completion of Personal Computer Hardware, the student will be able to answer:

1. Where are personal computers found and what use do they serve?
2. What is the difference between a local application and a network application?
3. What are some types of computing devices and what are their main applications?
4. How is data represented and manipulated in a computer system?
5. What is the role of the various computer components and peripherals?
6. What is the proper way to install and test computer components and peripherals?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.

Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.5 Explain the characteristics of networking hardware and applications and the methods to deploy them.
Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 3	Operating Systems	Class Hrs.	6	Lab Hrs.	3
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Description:

2.0 Unit Introduction 2.1 Choosing the Operating System 2.2 Installing the Operating System 2.3 Maintaining the Operating System 2.4 Installing multiple Operating Systems as virtual machines. 2.4 Unit Summary

Unit 3: Upon completion of Operating Systems, the student will be able to answer:

1. What is the purpose of an OS?
2. What role do the shell and kernel play?
3. What is the difference between a CLI and GUI interface?
4. What is a network redirector?
5. What are some of the common operating systems available?
6. What is the difference between commercial and GPL software licensing?
7. What are the different options for OS installation?
8. What is an OS upgrade and how is it performed?
9. What is a file system and what types are used with PCs?
10. What IP parameters must be configured to prepare a computer to participate on the network?
11. How are operating systems maintained?
12. What would be the purpose of Linux and server operating systems?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.

Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
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Anchor Standard: 6.6 Maintain a safe and healthful working environment.
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Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.5 Explain the characteristics of networking hardware and applications and the methods to deploy them.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 4	Connecting to the Network	Class Hrs.	6	Lab Hrs.	3
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Description:

<p>3.0 Unit Introduction</p> <p>3.1 Introduction to Networking</p> <p>3.2 Principals of Communication</p> <p>3.3 Communicating on a Local Wired Network</p> <p>3.4 Building the Access Layer of an Ethernet Network</p> <p>3.5 Building the Distribution Layer of a Network</p> <p>3.6 Plan and Connect a Local Network</p> <p>3.7 Unit Summary</p>

Unit 4: Upon completion of Connecting to the Network, the student will be able to answer:

1. What is meant by the term network and what are some of the more common networks we use in everyday life?
2. What are communication protocols?
3. How does communication occur across a local Ethernet network?
4. What are the main high-level components of an information network?
5. When does a computer play the role of a client, server, or both on a network?
6. How do you build a computer peer-to-peer network and verify it is functioning?
7. How are networks graphically represented and what is the difference between logical and physical network topologies?
8. What is the purpose of the access and distribution layers and what devices does each normally contain?
9. How do hubs, switches, and routers function?
10. What are a broadcast domain and a collision domain and why are they important?
11. What is ARP and how does it function?
12. What is the importance of a default gateway?
13. What is prototyping?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and

expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.5 Explain the characteristics of networking hardware and applications and the methods to deploy them.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 5	Connecting to the Internet Through an ISP	Class Hrs.	6	Lab Hrs.	3
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Description:

<p>4.0 Unit Introduction</p> <p>4.1 Characterizing Network Applications</p> <p>4.2 Explaining Common Network Applications</p> <p>4.3 Introducing Quality of Service (QoS)</p> <p>4.4 Examining Voice and Video Options</p> <p>4.5 Documenting Applications and Traffic Flows</p> <p>4.6 Unit Summary</p>
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Unit 5: Upon completion of Connecting to the Internet through an ISP, the student will be able to answer:

1. What is the Internet?
2. What is an Internet service provider (ISP) and what services can it provide?
3. What are the options for connecting to the Internet using an ISP?
4. How is the Internet Protocol (IP) used in sending messages across the Internet?
5. How is information sent across the Internet through an ISP?
6. What are the primary components of an ISP Network Operations Center (NOC)?
7. What are the environmental requirements of a home/small business network as compared to those of an ISP NOC?
8. What different types of cables and connectors are used for connecting the devices in a NOC?
9. What are the two main Ethernet unshielded twisted-pair (UTP) cable wiring standards?
10. What is the difference between a straight-through and crossover cable and where are they used in an Ethernet local network?
11. How are UTP cables constructed and terminated to provide a reliable connection?
12. What are UTP cabling best practices?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.

Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.11 Know multiple ways in which to transfer information and resources (e.g. text, data, sound, video, still images) between software programs and systems.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.5 Explain the characteristics of networking hardware and applications and the methods to deploy them.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 6	Network Addressing	Class Hrs.	6	Lab Hrs.	3
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Description:

5.0 Unit Introduction
5.1 IP Addresses and Subnet Masks
5.2 Types of IP Addresses
5.3 How IP Addresses are obtained
5.4 Address Management
5.5 Unit Summary

Unit 6: Upon completion of Network Addressing, the student will be able to answer:

1. What is the purpose of an IP address and subnet mask and how are they used on the Internet?
2. What is the difference between a unicast, multicast, and broadcast IP address?
3. What are the three classes of assignable IP addresses and what are their ranges?
4. How are IP addresses obtained?
5. What is the difference between a public and a private IP address and when is each used?
6. What is RFC 1918 address space?
7. How does NAT function?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.5 Explain the characteristics of networking hardware and applications and the methods to deploy them.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types

of media.

Academic Standards: Academic Standards: **RSIT11-12.3-** Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 7	Network Services	Class Hrs.	5	Lab Hrs.	3
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Description:

- 6.0 Unit Introduction
- 6.1 Client/Servers and Their Interaction
- 6.2 Application Protocols and Services
- 6.3 Layered Model and Protocols
- 6.4 Unit Summary

Unit 7: Upon completion of Network Services, the student will be able to answer:

1. What are the roles of a client and server and how do they interact over the network?
 2. What are some common network services available that operate in a client/server relationship?
 3. How do TCP and UDP transport protocols compare?
 4. What is the function of a port?
 5. What are well-known port numbers and the protocols/ applications that use them?
 6. What is Domain Name System (DNS) and its purpose?
 7. How do various types of Internet applications, such as e-mail, World Wide Web, FTP (File Transfer Protocol), IM (instant messaging), and voice interact?
 8. How does a protocol stack interact on a host when sending and receiving a message?
 9. What is the purpose of a layered networking model?
 10. What is the Open Systems Interconnect (OSI) layered network model?
- Anchor Standard: 2.1** Recognize the elements of communication using a sender-receiver model.
- Anchor Standard 2.3** Identify barriers to accurate and appropriate communication.
- Anchor Standard; 2.4** Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
- Anchor Standard: 2.6** Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
- Anchor Standard: 4.1** Use electronic reference materials to gather information and produce products and services.
- Anchor Standard: 5.1** Identify and ask significant questions that clarify various points of view to solve problems.
- Anchor Standard: 5.2** Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
- Anchor Standard: 5.3** Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
- Anchor Standard: 5.4** Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
- Anchor Standard: 5.6** Know the available resources for identifying and resolving problems.
- Anchor Standard: 6.3** Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
- Anchor Standard: 6.4** Practice personal safety when lifting, bending, or moving equipment or supplies.
- Anchor Standard: 6.6** Maintain a safe and healthful working environment.

Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 8	Wireless Technologies	Class Hrs.	6	Lab Hrs.	3
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Description:

<p>7.0 Unit Introduction 7.1 Wireless Technology 7.2 Wireless LANs 7.3 Security Considerations on a Wireless LAN 7.4 Configuring a n Integrated AP and Wireless Client 7.5 Unit Summary</p>
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Unit 8: Upon completion of Wireless Technologies, the student will be able to answer:

1. What are benefits and limitations of wireless technology?
2. Where are wireless technologies commonly used?
3. How does a wireless personal-area network (WPAN) compare to a wireless local-area network (WLAN) and a wireless wide-area network (WWAN)?
4. What components are required to build a WLAN and what are their functions?
5. What are the current standards for WLANs and how do they compare?
6. What parameters must be configured to allow a wireless client to access network resources?
7. What techniques are available to help secure the WLAN?
8. How is an access point and wireless client configured to allow communication to occur?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.

Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.8 Understand security concepts including authorization, rights, and encryption.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 9	Basic Security	Class Hrs.	6	Lab Hrs.	2
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Description:

8.0 Unit Introduction 8.1 Networking Threats 8.2 Methods of Attack 8.3 Security Policy 8.4 Using Firewalls 8.5 Unit Summary
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Unit 9: Upon completion of Basic Security, the student will be able to answer:

1. What are the main networking threats and their characteristics?
2. What are the different methods of attack?
3. What security procedures and applications exist to help prevent attacks?

4. What is a firewall and how is it used to protect against an attack?
5. What is a DMZ and how is basic DMZ architecture structured?
6. How do you configure a DMZ and port forwarding with an integrated router device?
7. What is vulnerability analysis software and how can it help prevent attacks?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 8.8 Identify legal and ethical issues that have proliferated with increased technology adoption, including hacking, scamming, and breach of privacy.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.8 Understand security concepts including authorization, rights, and encryption.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 10	Troubleshooting Your Network	Class Hrs.	6	Lab Hrs.	3
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Description:

9.0 Unit Introduction
9.1 Troubleshooting Process
9.2 Troubleshooting Issues
9.3 Common Issues
9.4 Troubleshooting and the Help Desk
9.5 Unit Summary

Unit 10: Upon completion of Troubleshooting Your Network, the student will be able to answer:

1. What are the steps involved in the troubleshooting process?
2. What are some of the common troubleshooting techniques and when is it appropriate to use each?
3. How can the senses be used to troubleshoot network issues?
4. What utilities are available for troubleshooting connectivity issues?
5. What are some of the more common issues with wired networks?
6. What are some of the common issues related to WLANs?
7. What are some possible sources of help when troubleshooting?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a

computer and a network and how they relate to each other.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of students.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Totals	Theory Hrs.	61	Lab Hrs.	26	Total Hrs.	93
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Instructional Module/Unit Working at a Small-to-Medium Business or ISP

Course Goals

1. Gain an introduction of the Internet and the role of the Internet Service Provider (ISP)
2. Understand the responsibilities of a Help Desk Technician.
3. Understand the basics of planning a network upgrade.
4. Identify classful and classless networks and subnets.
5. Identify the commands required to configure network devices.
6. Understand the basics of routing protocols and how they are used across the Internet.
7. Identify network services provided by an ISP.
8. Understand security policies and procedures related to the ISP.
9. Learn how to troubleshoot layer issues.
10. Be able to summarize information received in units 1 through 9.

Unit 1	The Internet and Its Uses	Class Hrs.	6.5	Lab Hrs.	1.5
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Description:

1.0 Unit Introduction
1.1 What is the Internet?
1.2 Internet Service Providers
1.3 ISP Connectivity
1.4 Unit Summary

Unit 1: Upon completion of The Internet and Its Uses, the student will be able to answer:

1. How is the Internet evolving?
2. How do businesses and individuals use the Internet?
3. What is the importance of standards in the continuing growth of the Internet?
4. What is the role of an Internet service provider (ISP)?
5. How does the hierarchical structure of the Internet allow the efficient movement of information?
6. What are a point of presence (POP) and an Internet Exchange Point (IXP)?
7. What types of devices do ISPs use to provide services?
8. What is scalability, and why is it important in the ISP network?

9. What support teams work at an ISP, and what is their purpose?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 2	Help Desk	Class Hrs.	6.5	Lab Hrs.	2.5
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Description:

2.0 Unit Introduction
2.1 Help Desk Technicians

2.2 OSI Model
2.3 ISP Troubleshooting
2.4 Unit Summary

Unit 2: Upon completion of Help Desk, the student will be able to answer:

1. What are the various roles of help desk and installation technicians?
2. What levels of support do help desk technicians provide?
3. What are the seven layers of the OSI model, and how is the OSI model used to troubleshoot network issues?
4. What common tools and diagnostic procedures do help desk technician's use?
5. What onsite procedures are used to help resolve issues?
Anchor Standard: 3.4 Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
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Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.

Academic Standards: Academic Standards: **RSIT11-12.3-** Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 3	Planning a Network Upgrade	Class Hrs.	5	Lab Hrs.	4
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Description:

- 3.0 Unit Introduction
- 3.1 Common Issues
- 3.2 Planning the Network Upgrade
- 3.3 Purchasing and Maintaining Equipment
- 3.4 Unit Summary

Unit 3: Upon completion of Planning a Network Upgrade, the student will be able to answer:

1. Why is proper planning necessary when you perform a network upgrade?
2. What is a site survey, and why is it necessary?
3. What steps are involved in performing a site survey?
4. What is structured cabling?
5. What factors must you consider when upgrading LAN and internetworking devices?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
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Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a

computer and a network and how they relate to each other.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 4	Planning the Addressing Structure	Class Hrs.	5	Lab Hrs.	3
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Description:

4.0 Unit Introduction 4.1 IP Addressing in the LAN 4.2 NAT and PAT 4.3 Unit Summary
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Unit 4: Upon completion of planning the Addressing Structure, the student will be able to answer:

1. How is IP addressing implemented in the LAN?
2. What are classful and classless networks and subnets?
3. How can a given network be sub netted to allow for efficient use of IP addresses?
4. How are Network Address Translation (NAT) and Port Address Translation (PAT) used in a network?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.

Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 5	Configuring Network Devices	Class Hrs.	3	Lab Hrs.	5
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Description:

5.0 Unit Introduction 5.1 Initial ISR Router Configuration 5.2 Configuring an ISR with SDM 5.3 Configuring a Router Using IOS CLI 5.4 Connecting the CPE to the ISP 5.5 Expanding LAN Switching Connectivity 5.6 Unit Summary

Unit 5: Upon completion of Configuring Network Devices, the student will be able to answer:

1. What is an ISR?
2. What methods are available for configuring an ISR?
3. How does in-band configuration differ from out-of-band configuration?
4. When is it appropriate to use SDM or SDM Express to configure a Cisco device?
5. What is the difference between the startup configuration and the running configuration?
6. What commands are required to perform basic configuration on a Cisco 1841 ISR?
7. What commands are required to configure an ISR to function as a DHCP server?
8. What commands are necessary to configure static NAT on an ISR?
9. What commands are required to perform basic configuration on a Cisco 2960 switch?
10. What is switch port security, and how is it configured?
11. What is CDP, and how does it function?
12. What types of WAN connections are available, and how do they compare in terms of cost and speed?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.

Anchor Standard: 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 6	Routing	Class Hrs.	6	Lab Hrs.	2
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Description:

6.0 Unit Introduction 6.1 Enabling Routing Protocols 6.2 Exterior Routing Protocols 6.3 Unit Summary

Unit 6: Upon completion of Routing, the student will be able to answer:

1. What are the purpose and function of dynamic routing?
2. What are the characteristics of directly connected static and dynamic routes?
3. What are the main interior gateway protocols and their key features?
4. How is RIPv2 dynamic routing configured using the Cisco IOS?
5. What are exterior gateway routing protocols, and how are they used across the Internet?
6. What is required to enable BGP on a customer site router?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
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Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
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Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
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Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
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Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop

over the course of the text.

Unit 7	ISP Services	Class Hrs.	5.5	Lab Hrs.	3.5
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Description:

- 7.0 Unit Introduction
- 7.1 Introducing ISP Services
- 7.2 Protocols That Support ISP Services
- 7.3 Domain Name Service
- 7.4 Services and Protocols
- 7.5 Unit Summary

Unit 7: Upon completion of ISP Services, the student will be able to answer:

1. What types of network services does an ISP provide?
2. What protocols support the services offered by an ISP, and how do they work?
3. How does UDP differ from TCP?
4. What type of traffic uses UDP, and what type uses TCP?
5. What are some of the more common application layer protocols, and what is their purpose?
6. What is the purpose of the Domain Name System (DNS), and how does it function?
7. How do common protocols such as HTTP, HTTPS, FTP, SMTP, IMAP, and POP3 function?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
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Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.

Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
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Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 8	ISP Responsibility	Class Hrs.	6	Lab Hrs.	2
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Description:

8.0 Unit Introduction 8.1 ISP Security Considerations 8.2 Security Tools 8.3 Monitoring and Managing the ISP 8.4 Backups and Disaster Recovery 8.5 Unit Summary
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Unit 8: Upon completion of ISP Responsibility, the student will be able to answer:

1. What security policies and procedures do ISPs employ?
2. What tools are used to implement security at the ISP?
3. How is the ISP monitored and managed?
4. What are the ISP's responsibilities for maintenance and recovery
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
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Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment

or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
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Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 9	Preparing for Certification	Class Hrs.	6	Lab Hrs.	2
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Description:

- 9.0 Unit Introduction - What Does a Cisco Certification Measure?
- 9.1 Ways to Prepare
- 9.2 Identifying and Correcting Layer 1 Issues
- 9.3 Identifying and Correcting Layer 2 Issues
- 9.4 Identifying and Correcting Layer 3 IP Addressing Issues
- 9.5 Identifying and Correcting Layer 3 IP Routing Issues
- 9.6 Common Upper Layer Connectivity Issues
- 9.7 Unit Summary

Unit 9: Upon completion of Troubleshooting, the student will be able to answer:

- | |
|---|
| 1. How is the OSI model used as a framework for troubleshooting network problems? |
| 2. How are problems with hardware and the operation of Layer 1 and Layer 2 identified and corrected? |
| 3. What is the procedure for troubleshooting IP addressing problems, including subnet mask, host range errors, DHCP and NAT issues? |
| 4. How do you identify and correct problems with RIPv2 configuration and implementation? |
| 5. What are some possible causes of problems occurring with user applications and how can symptoms of DNS failure be recognized? |
| 6. What must be done to create a plan to prepare to take the ICND1 examination in order to obtain a CCENT certification? |
| Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model. |
| Anchor Standard 2.3 Identify barriers to accurate and appropriate communication. |

Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 10	Course Summary	Class Hrs.	8	Lab Hrs.	0
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Description:

10.0 Putting It All Together

Unit 10: Upon completion of Course Summary, the student will be able to:

1. Summarize Units 1 through 9.
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce

products and services.
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Totals	Theory Hrs.	57.5	Lab Hrs.	25.5	Total Hrs.	83
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Instructional Module/Unit Introducing Routing and Switching in the Enterprise

Course Goals

1. Understand what an Enterprise is and how traffic flows.
2. Identify components of the network infrastructure and how service is delivered.
3. Know how to update existing Cisco IOS and upgrade hardware.
4. Understand the benefits of a hierarchical IP addressing structure and document applications and traffic flows.
5. Understand the basics of routing with a distance vector protocol.
6. Understand the basics of routing with a link-state protocol.

7.Understand the basics of implementing enterprise WAN links.
8.Define traffic filtering and Access Control Lists.
9.Know how to troubleshoot an enterprise network.
10.Summarize the information learned in units 1 through 9.

Unit 1	Networking in the Enterprise	Class Hrs.	6	Lab Hrs.	2
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Description:

- 1.0 Chapter Introduction
- 1.1 Describing the Enterprise Network
- 1.2 Identifying Enterprise Applications
- 1.3 Supporting Remote Workers
- 1.4 Chapter Summary

Unit 1: Upon completion of Networking in the Enterprise, the student will be able to answer:

1. What is an enterprise?
2. How does traffic flow in an enterprise network?
3. How is traffic handled in an enterprise?
4. How does an extranet compare to an intranet?
5. What is a telecommuter, and what services does a telecommuter require?
6. What is the importance of a How does traffic flow in an enterprise network? VPN?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 2	Exploring the Enterprise Network Infrastructure	Class Hrs.	5.5	Lab Hrs.	2.5
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Description:

<p>2.0 Chapter Introduction</p> <p>2.1 Introducing Cisco Lifecycle Services</p> <p>2.2 Explaining the Sales Process</p> <p>2.3 Preparing for the Design Process</p> <p>2.4 Identifying Technical Requirements and Constraints</p> <p>2.5 Identifying Manageability Design Considerations</p> <p>2.6 Chapter Summary</p>

Unit 2: Upon completion of this unit, the student will be able to answer:

1. What are the main types of network documentation and how are they interpreted?
2. What equipment is found in the enterprise Network Operations Center?
3. What is the point of presence for service delivery and how is service delivered?
4. What are network security considerations and what equipment is used at the enterprise edge?
5. What are some characteristics of router and switch hardware?
6. What are the most common and useful router and switch CLI configuration and verification commands?
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Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
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Pathway Standard:

Unit 3	Switching in an Enterprise Network	Class Hrs.	5	Lab Hrs.	3
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Description:

3.0 Chapter Introduction
3.1 Documenting the Existing Network
3.2 Updating the Existing Cisco IOS
3.3 Upgrading Existing Hardware
3.5 Documenting Network Design Requirements
3.6 Chapter Summary

Unit 3: Upon completion of Switching in an Enterprise Network, the student will be able to answer:

1. What types of switches are found in an enterprise network?
2. How does Spanning Tree Protocol prevent switching loops?
3. What is a VLAN and what purpose does it serve?
4. How is a VLAN configured on a Cisco switch?
5. What is inter-VLAN routing and how is it configured?
6. What is VLAN Trunking Protocol and how does it help maintain VLANs in an enterprise network?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 4	Addressing in an Enterprise Network	Class Hrs.	5	Lab Hrs.	3
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Description:

4.0 Chapter Introduction
4.1 Characterizing Network Applications
4.2 Explaining Common Network Applications
4.3 Introducing Quality of Service (QoS)
4.4 Examining Voice and Video Options
4.5 Documenting Applications and Traffic Flows
4.6 Chapter Summary

Unit 4: Upon completion of Addressing in an Enterprise Network, the student will be able to answer:

1. What are the features and benefits of a hierarchical IP addressing structure?
2. How is a VLSM IP address scheme planned and implemented?
3. How is classless routing and CIDR used in planning a network?
4. How are static and dynamic NAT configured and verified?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.

Anchor Standard: 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
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Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 5	Routing with a Distance Vector Protocol	Class Hrs.	4	Lab Hrs.	4
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Description:

<p>5.0 Chapter Introduction</p> <p>5.1 Analyzing the Requirements</p> <p>5.2 Selecting the Appropriate LAN Topology</p> <p>5.3 Designing the WAN and Remote Worker Support</p> <p>5.4 Designing Wireless Networks</p>

5.5 Incorporating Security

5.6 Chapter Summary

Unit 5: Upon completion of Routing with a Distance Vector Protocol, the student will be able to answer:

1. What is a hierarchical network and why is it required?
2. What is the difference between a static, dynamic, and default route?
3. How does RIP function?
4. What are the limitations of RIP?
5. What are the advantages of RIPv2 over RIPv1?
6. What advantages does EIGRP have over RIP?
7. What is the purpose of the various packet types used by EIGRP?
8. What tables does EIGRP use, and what is their purpose?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Unit 6	Routing with a Link-State Protocol	Class Hrs.	6	Lab Hrs.	3
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Description:

- 6.0 Chapter Introduction
- 6.1 Creating an Appropriate IP Addressing Design
- 6.2 Creating the IP Address and Naming Scheme
- 6.3 Describing IPv4 and IPv6
- 6.4 Chapter Summary

Unit 6: Upon completion of Routing with a Link-State Protocol, the student will be able to answer:

1. How does OSPF routing function?
2. What is necessary to plan a network using OSPF?
3. How is a single-area OSPF network designed and configured?
4. What are multiprotocol environments, and what issues are associated with them?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
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Unit 7	Implementing Enterprise WAN Links	Class Hrs.	4	Lab Hrs.	4
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Description:

7.0 Chapter Introduction
7.1 Building a Prototype to Validate a Design
7.2 Prototyping the LAN
7.3 Prototyping the Server Farm
7.4 Chapter Summary

Unit 7: Upon completion of Implementing Enterprise WAN Links, the student will be able to answer:

1. What WAN connectivity options are available?
2. What are the relative advantages and limitations of the various WAN connectivity options?
3. What advantages does PPP have over HDLC?
4. What steps are required to configure a PPP link between two devices?
5. How does CHAP differ from PAP authentication?
6. What happens to data on a Frame Relay network that exceeds the CIR?
7. How does a Frame Relay network handle congestion?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Unit 8	Filtering Traffic Using Access Control Lists	Class Hrs.	6	Lab Hrs.	3
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Description:

8.0 Chapter Introduction
8.1 Prototyping Remote Connectivity
8.2 Prototyping WAN Connectivity
8.3 Prototyping Remote Worker Support
8.4 Chapter Summary

Unit 8: Upon completion of Filtering Traffic Using Access Control Lists, the student will be able to answer:

9. What is traffic filtering?
10. How to access control lists (ACL) filter traffic at router interfaces?
11. What is an ACL wildcard mask and how is it used?
12. How are ACLs configured and implemented?
13. How can ACL activity be logged?
14. What are ACL best practices?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 9	Troubleshooting an Enterprise Network	Class Hrs.	5	Lab Hrs.	3
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Description:

<p>9.0 Chapter Introduction</p> <p>9.1 Assembling the Existing Proposal Information</p> <p>9.2 Developing the Implementation Plan</p> <p>9.3 Planning for the Installation</p> <p>9.4 Creating and Presenting the Proposal</p> <p>9.5 Chapter Summary</p>

Unit 9: Upon completion of Troubleshooting an Enterprise Network, the student will be able to answer:

1. What is uptime, and why is it important?
2. What is a failure domain, and why is it important?

3. What types of issues can cause a network to fail?
4. How would you isolate and correct common switching problems?
5. How would you isolate and correct common routing problems?
6. How would you isolate and correct common WAN link issues?
7. How would you isolate and correct common ACL problems?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
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Unit 10	Course Summary	Class Hrs.	7	Lab Hrs.	0
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Description:

10.0	Putting it all together.
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Unit 10: Upon completion of Course Summary, the student will be able to:

1. Summarize Units 1 through 9.
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Totals	Theory Hrs.	53.5	Lab Hrs.	27.5	Total Hrs.	81
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Instructional Module/Unit Designing and Supporting Computer Networks

Course Goals

1. Understand network design basics and identify design considerations for a variety of areas.
2. Can gather network requirements and define the roles of a network partner team.
3. Perform upgrades to existing Cisco IOS and hardware as well as document existing network.
4. Identify application impacts on network designs.
5. Design WAN, Remote Worker Support, and wireless networks.
6. Understand how to use IP addressing in the network design.
7. Understand how to build prototypes and perform proof-of-concept tests.
8. Identify the steps to prototype remote connectivity, WAN connectivity, and Remote worker support.
9. Complete the steps to create and present a network upgrade proposal.
10. Summarize the information learned in units 1 through 9.

Unit 1	Introducing Network Design Concepts	Class Hrs.	5.5	Lab Hrs.	2.5
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Description:

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|---|
| <ul style="list-style-type: none"> 1.0 Chapter Introduction 1.1 Discovering Network Design Basics 1.2 Investigating Core Layer Design Considerations 1.3 Investigating Distribution Layer Considerations 1.4 Investigating Access Layer Design Considerations 1.5 Investigating Server Farms and Security 1.6 Investigating Wireless Network Considerations 1.7 Supporting WANs and Remote Workers 1.8 Chapter Summary |
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Unit 1: Upon completion of Introducing Network Design Concepts, the student will be able to answer:

1. What are the benefits of a hierarchal network design?
2. What is the design methodology used by network designers?
3. What are the design considerations for the core, distribution, and access layers?
4. What are the design considerations for the network enterprise edge?
5. What are the design considerations that must be met to support remote workers?
6. What are the design considerations for supporting enterprise wireless and/or data center/server farms?
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Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Unit 2	Gathering Network Requirements	Class Hrs.	5	Lab Hrs.	2
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Description:

<p>2.0 Chapter Introduction</p> <p>2.1 Introducing Cisco Lifecycle Services</p> <p>2.2 Explaining the Sales Process</p> <p>2.3 Preparing for the Design Process</p> <p>2.4 Identifying Technical Requirements and Constraints</p> <p>2.5 Identifying Manageability Design Considerations</p> <p>2.6 Chapter Summary</p>

Unit 2: Upon completion of Gathering Network Requirements, the student will be able to answer:

1. What occurs during the six phases of the PPDIIO model?
2. What is the proper way to respond to a Request for Proposal or Request for Quote?
3. What are the roles of a network partner team?
4. How are business goals prioritized to determine technical requirements for a network upgrade project?
5. How do constraints affect the design of a network?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.

Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Unit 3	Characterizing the Existing Network	Class Hrs.	5	Lab Hrs.	2
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Description:

<p>3.0 Chapter Introduction</p> <p>3.1 Documenting the Existing Network</p> <p>3.2 Updating the Existing Cisco IOS</p> <p>3.3 Upgrading Existing Hardware</p>

- 3.4 Performing a Wireless Site Survey
- 3.5 Documenting Network Design Requirements
- 3.6 Chapter Summary

Unit 3: Upon completion of characterizing the Existing Network, the student will be able to answer:

1. How does characterizing the network to identify strengths and weaknesses assist in the network design process?
2. What are appropriate hardware and software upgrades to prepare a network for integration of new technologies?
3. How do you upgrade the Cisco IOS Software on a router or switch?
4. How do you conduct a wireless site survey?
5. How do you create a network Design Requirements document?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Unit 4	Identifying Application Impacts on Network Design	Class Hrs.	5	Lab Hrs.	3
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Description:

4.0 Chapter Introduction
4.1 Characterizing Network Applications
4.2 Explaining Common Network Applications
4.3 Introducing Quality of Service (QoS)
4.4 Examining Voice and Video Options
4.5 Documenting Applications and Traffic Flows
4.6 Chapter Summary

Unit 4: Upon completion of Identifying Application Impacts on Network Design, the student will be able to answer:

1. How do the characteristics of various applications affect the design of the network?
2. What are the network requirements of various common applications, including voice and video?
3. How does quality of service support converged networking, and how is it implemented into network design?
4. How does diagramming various application traffic flows determine where bandwidth is needed and where potential bottlenecks exist?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Unit 5	Creating the Network Design	Class Hrs.	5	Lab Hrs.	3
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Description:

<p>5.0 Chapter Introduction</p> <p>5.1 Analyzing the Requirements</p> <p>5.2 Selecting the Appropriate LAN Topology</p> <p>5.3 Designing the WAN and Remote Worker Support</p> <p>5.4 Designing Wireless Networks</p> <p>5.5 Incorporating Security</p> <p>5.6 Chapter Summary</p>
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Unit 5: Upon completion of Creating the Network Design, the student will be able to answer:

1. What is the proper way to analyze the business goals and technical requirements to produce the required design?
2. How do you design the core, distribution, and access layer topologies for a campus network?
3. How do you design for the WAN connectivity module and remote worker support?
4. How do you design a wireless network topology?
5. How do you incorporate security into the network design?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Unit 6	Using IP Addressing in the Network Design	Class Hrs.	5	Lab Hrs.	3
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Description:

6.0 Chapter Introduction 6.1 Creating an Appropriate IP Addressing Design 6.2 Creating the IP Address and Naming Scheme 6.3 Describing IPv4 and IPv6 6.4 Chapter Summary
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Unit 6: Upon completion of Using IP Addressing in the Network Design, the student will be able to answer:

1. How do you select the appropriate hierarchical IP addressing scheme to meet the physical and logical network requirements?
2. How do you choose a routing protocol and design a route summarization strategy?
3. How do you create a logical naming structure for networking devices?
4. What is IPv6 and what are the methods to implement it on a network?

5. How is IPv6 implemented on a Cisco device?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Unit 7	Prototyping the Campus Network	Class Hrs.	5	Lab Hrs.	3
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Description:

7.0 Chapter Introduction
7.1 Building a Prototype to Validate a Design
7.2 Prototyping the LAN

7.3 Prototyping the Server Farm

7.4 Chapter Summary

Unit 7: Upon completion of Prototyping the Campus Network, the student will be able to answer:

1. What is the purpose of a proof-of-concept test?
2. How do you create a test plan to perform simulated or prototype tests of a network upgrade?
3. How do you perform proof-of-concept tests according to test plans?
4. How do you identify risks and weaknesses in the design based on the proof-of-concept test conclusions?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Unit 8	Prototyping the WAN	Class Hrs.	5	Lab Hrs.	3
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Description:

<p>8.0 Chapter Introduction 8.1 Prototyping Remote Connectivity 8.2 Prototyping WAN Connectivity 8.3 Prototyping Remote Worker Support 8.4 Chapter Summary</p>
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Unit 8: Upon completion of Prototyping the WAN, the student will be able to answer:

1. What are the components and technologies used for WAN connectivity?
2. What are the components of a Frame Relay network?
3. How do you configure a Frame Relay connection?
4. What are the VPN technologies available to connect remote sites and workers?
5. How do you configure a VPN client to connect to a VPN server?
6. How do you perform proof-of-concept tests of WAN and remote worker connectivity?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
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Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a

computer and a network and how they relate to each other.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 9	Preparing the Proposal	Class Hrs.	4	Lab Hrs.	2
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Description:

<p>9.0 Chapter Introduction</p> <p>9.1 Assembling the Existing Proposal Information</p> <p>9.2 Developing the Implementation Plan</p> <p>9.3 Planning for the Installation</p> <p>9.4 Creating and Presenting the Proposal</p> <p>9.5 Chapter Summary</p>

Unit 9: Upon completion of Presenting and Implementing the Network Design, the student will be able to answer:

1. How do you create a bill of materials for a proposed network upgrade?
2. How do you plan the implementation schedule for a phased network upgrade project?
3. How do you determine the software and hardware support contract options that meet customer requirements?
4. How do you create and present a network upgrade proposal, including implementation schedule and cost summary?
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.

Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Unit 10	Course Summary	Class Hrs.	5	Lab Hrs.	0
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Description:

10.0 Putting It All Together

Unit 10: Upon completion of Course Summary, the student will be able to:

1. Summarize Units 1 through 9.
Anchor Standard: 2.1 Recognize the elements of communication using a sender-receiver model.
Anchor Standard 2.3 Identify barriers to accurate and appropriate communication.
Anchor Standard; 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
Anchor Standard: 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
Anchor Standard: 4.1 Use electronic reference materials to gather information and produce products and services.
Anchor Standard: 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
Anchor Standard: 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
Anchor Standard: 5.3 Use systems of thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
Anchor Standard: 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
Anchor Standard: 5.6 Know the available resources for identifying and resolving problems.
Anchor Standard: 6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
Anchor Standard: 6.4 Practice personal safety when lifting, bending, or moving equipment or supplies.
Anchor Standard: 6.6 Maintain a safe and healthful working environment.
Anchor Standard: 8.1 Access, analyze, and implement quality assurance standards of practice.
Anchor Standard: 9.7 Participate in interactive teamwork to solve real information and Communication Technologies sector issues and problems.
Anchor Standard: 10.1 Interpret and explain terminology and practices specific to the

Information and Communication Technologies sector.
Anchor Standard: 10.2 Comply with rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.
Anchor Standard: 10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.
Anchor Standard: 11.1 Utilize work-based learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the information and communication Technologies sector program of study.
Pathway Standard: B1.1 Define the terminology used in the design, assembly, configuration, and implementation of networks.
Pathway Standard: B6.3 Configure compatible systems across various platforms and types of media.
Academic Standards: Academic Standards: RSIT11-12.3- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or interact and develop over the course of the text.

Totals	Theory Hrs.	49.5	Lab Hrs.	23.5	Total Hrs.	73
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Total Course Hours

Totals	Theory Hrs.	225.5	Lab Hrs.	102.5	Total Hrs.	324
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APPENDIX A:

MATRIX FOR ALL ASPECTS OF THE INDUSTRY

All Aspects of the Industry is a key element of the Carl D. Perkins Vocational and Applied Technology Education Act and the School-to Work Opportunities Act. Both acts emphasize giving students a comprehensive perspective and range of skills across an industry. The Perkins Act requires programs to “provide students with strong experience in and understanding of all aspects of the industry students are preparing to enter”. The Act identifies eight aspects in particular, which are common to any business or industry. Programs receiving Perkins funds are required to include the teaching of these concepts to provide students with the skills necessary to be successful in their employment.

STRATEGIES

Below is a matrix showing the components of “All Aspects of the Industry for the *name of Course*.” A list of strategies is provided for each component.

ASPECTS	SEQUENCE OF COURSES
	Course I & II: Certified Network Administrator Cisco® CCNT
Planning	Students are familiar with the business types and the importance of their planning in the IT industry. They also have an understanding of the various forms of ownership and the impact that their planning and success has on the economic, political and social conscience is discussed.
Management	Students are aware of the management methods used to manage enterprises over time within the industry. Students understand how workers’ jobs are diversified and expanded, and the methods used to broaden worker involvement in the decision-making process.
Finance	Students understand the accounting and financial decisions that are made in the IT industry for: New startup business, rising capital and expanding existing ventures. Students also understand the paperwork that is used by many businesses such as work orders, invoices and time keeping reports.
Technical & Production Skills	Students are aware of specific techniques used by Computer technicians; also, how to organize work load and cross training strategies for workers.
Underlying Principles Of Technology	Students are aware of the underlying principles that support our curriculum and industry such as the Mathematical, Scientific, Social and Economic principles that underlie the technology.
Labor Issues	Students are aware of labor issues, such as workers’ rights, labor unions, labor history and methods used for expanding the worker’s role.
Community Issues	Students are aware of the involvement an impact of the industry on the community and the impact of the community on the industry.

Health, Safety, & Environmental Issues	Students are aware of the Health, Safety, and Environmental issues of the industry as they relate to the workers, the community and the environment.
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