

Standards Alignment



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Cisco Networking Academy Curricula Alignment to Education Standards

The following pages include a series of tables showing the close alignment between specific elements of Cisco Networking Academy curricula and these education standards:

STEM
Common Core Standards
21st Century Skills

Cisco Networking Academy Alignment to STEM, Common Core Standards, and 21st Century Skills

Purpose of this Document

To help educators and those leading education efforts define a STEM education program that aligns to standards, and provides students with a path to a career or advanced education. See *additional ways you can use this document below*.

Page 2: STEM, CCS, 21C Alignment

Identify connections between recognized education standards and Cisco Networking Academy curricula objectives and activities.

Pages 3-7: Curricula Examples

Shows exactly how examples of specific Cisco Networking Academy course content that demonstrate education standards, while also demonstrating alignment between STEM career cluster knowledge and skills topics, and Common Core Standards.

Notes:

Research for this alignment was completed by a 3rd party outside of Cisco. Science and Technical Literacy standards are taken from the National Research Council's "Next Generation Science" framework.

How you can use this tool:

- Instructors**
 1. Identify relevant STEM Education program that engages students
 2. Plan lessons that meet standards recognized by business and industry
 3. Identify opportunities for interdisciplinary teaching to reinforce critical skills across disciplines
 4. Integrate content and activities that help students master STEM skills and Common Core Standards
 5. Track completion of STEM career cluster knowledge and skills topics necessary for future education and employment

- Administrators**
 1. Document how instruction is relevant to community and industry expectations
 2. Monitor knowledge and skills development for continuous improvement
 3. Identify, observe and evaluate curricula that enacts standards-based instruction
 4. Provide engaging, relevant, career-oriented reinforcement of academic standards
 5. Support interdisciplinary instruction across academic, career and technology programs

- State / Federal**
 1. Document program relevance for state- and national-level educational initiatives
 2. Recognize the contribution of Networking Academy curricula to national educational reform
 3. Observe and evaluate how teachers and students actually respond to standards-based instruction
 4. Document curricula and instruction that supports strategies and plans related to discretionary grant process
 5. Support interdisciplinary instruction across academic, career and technology programs

Cisco Networking Academy Alignment to STEM, Common Core Standards, and 21st Century Skills

See other pages for specific examples from each course.

Embedded STEM Cluster Topics

	SCC01 Academic Foundations	SCC02 Communications	SCC03 Problem-Solving & Critical Thinking	SCC04 Information Technology Applications	SCC05 Systems	SCC06 Safety, Health & Environmental	SCC07 Leadership and Teamwork	SCC08 Ethics & Legal Responsibilities	SCC09 Employability & Career Development	SCC10 Technical Skills
Cisco Networking Academy Courses										
IT Essentials: PC Hardware and Software, Chapters 1-10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CCNA Discovery 1: Networking for Home and Small Business, Chapters 1-10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CCNA Discovery 2: Working at a Small Business or Internet Service Provider (ISP), Chapters 1-10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CCNA Discovery 3: Introducing Routing and Switching in the Enterprise, Chapters 1-10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CCNA Discovery 4: Designing and Supporting Computer Networks, Chapters 1-10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Embedded Common Core Standards

	Science & Technical Literacy (based on Next Generation Science standard)	Anchor College & Career Readiness: Reading	Anchor College & Career Readiness: Writing	Anchor College & Career Readiness: Speaking and Listening	Anchor College & Career Readiness: Language	Mathematical Practice
IT Essentials: PC Hardware and Software, Chapters 1-10	✓	✓	✓	✓	✓	✓
CCNA Discovery 1: Networking for Home and Small Business, Chapters 1-10	✓	✓	✓	✓	✓	✓
CCNA Discovery 2: Working at a Small Business or Internet Service Provider (ISP), Chapters 1-10	✓	✓	✓	✓	✓	✓
CCNA Discovery 3: Introducing Routing and Switching in the Enterprise, Chapters 1-10	✓	✓	✓	✓	✓	✓
CCNA Discovery 4: Designing and Supporting Computer Networks, Chapters 1-10	✓	✓	✓	✓	✓	✓

Cisco Networking Academy Alignment to STEM, Common Core Standards, and 21st Century Skills, continued

See other pages for specific examples from each course.

Partnership for 21st Century Skills: Learning & Innovative Skills

	Creativity & Innovation	Critical Thinking & Problem-Solving	Communication & Collaboration	Information Literacy	Media Literacy	Information Communication Technology Literacy	Flexibility & Adaptability	Initiative & Self-Direction	Social & Cross-Cultural Skills	Productivity & Accountability	Leadership & Responsibility
IT Essentials: PC Hardware and Software, Chapters 1-10	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
CCNA Discovery 1: Networking for Home and Small Business, Chapters 1-10	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
CCNA Discovery 2: Working at a Small Business or Internet Service Provider (ISP), Chapters 1-10	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
CCNA Discovery 3: Introducing Routing and Switching in the Enterprise, Chapters 1-10	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
CCNA Discovery 4: Designing and Supporting Computer Networks, Chapters 1-10	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓

Specific Examples of IT Essentials Coursework Alignment to STEM and Common Core Standards

Comparison does not include all qualifying coursework; use as example only.

STEM Career Cluster Engineering and Technology Pathway		Related Common Core Standards Science/Technical Literacy from "Next General Science"	Cisco Networking Academy Course Alignment: Sample IT Essentials content demonstrating skills & standards
Cluster Knowledge & Skills Topics	Students preparing for STEM cluster careers should be able to demonstrate these skills		
SCC01 Academic Foundations	Achieve additional academic knowledge and skills required to pursue the full range of career and postsecondary education opportunities within a career cluster.	Anchor College and Career Readiness--Writing: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation. Anchor College and Career Readiness--Speaking and Listening: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing one's own clearly and persuasively.	Ch. 9.1: Develop research skills by completing a research worksheet on security threats. Ch. 1.1.2: Describe the A+ certification and associated tests. Use the Internet and other sources to gather information on job opportunities in the computer service and repair field.
SCC02 Communications	Use oral and written communication skills in creating, expressing and interpreting information and ideas including technical terminology and information.	Anchor College and Career Readiness--Speaking and Listening: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally Anchor College and Career Readiness--Language: Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening. Science/Technical Literacy: Follow precisely a complex multistep procedure.	Ch. 10.2.1: Practice active listening skills in order to determine a customer's computer problem. Use clarification questions in order to refine your understanding of the problem. Ch. 5.3.1: Identify applications and environments that are compatible with an operating system; use key questions to determine budgetary constraints, intended use, and applications desired by the customer. Ch. 10.2.2: Display professional behavior when putting a customer on hold or when transferring a call. Ch. 10.2.3: Identify and discuss managing difficult customers.
SCC03 Problem-Solving & Critical Thinking	Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.	Science/Technical Literacy: Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. Mathematical Practice: Make sense of problems and persevere in solving them. Anchor College and Career Readiness--Reading: Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words Science/Technical Literacy: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. Mathematical Practice: Construct viable arguments and critique the reasoning of others.	Ch. 3: Complete assembly of a PC, following best practices and procedures. Ch. 4.2.6: Employ an organized and logical approach to computer problem-solving. Describe possible locations of solutions. Prioritize possible solutions and divide larger problems into smaller ones that can be analyzed and solved individually. Ch. 2.3.4: Disassemble a computer, using proper tools and procedures. Ch. 3.2: Using both the Virtual Desktop PC and hands-on lab, install a power supply. Ch. 7.4.2: Locate, download and install software upgrades for an all-in-one device Ch. 8.12.2: Decide which customer information is relevant when diagnosing a network problem, then apply proper troubleshooting procedures to resolve the problem
SCC04 Information Technology Applications	Use information technology tools specific to the career cluster to access, manage, integrate, and create information.	Mathematical Practice: Use appropriate tools strategically.	Ch. 5.3.2: Locate and use an HCL to determine minimum hardware requirements and compatibility with the OS platform. Ch. 2.2.2: Identify a range of software tools to help diagnose problems, maintain hardware, and protect the data stored on a computer.

<p>SCC05 Systems</p>	<p>Understand roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment. Identify how key organizational systems affect organizational performance and the quality of products and services. Understand global context of industries and careers.</p>	<p>Anchor College and Career Readiness--Reading: Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.</p> <p>Anchor College and Career Readiness--Speaking and Listening: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing one's own clearly and persuasively.</p>	<p>Ch. 8.8: Explain OSI and TCP/IP data models. Identify relationships between the two models through a matching activity.</p> <p>Ch. 10.4.1: Describe the call center environment. Describe and compare the responsibilities of level-one and level-two technicians.</p> <p>Ch. 9.3.1: Explain what is required in a basic local security policy; describe the role of employee training in observing the policy.</p>
<p>SCC06 Safety, Health & Environmental</p>	<p>Understand the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance. Follow organizational policies and procedures and contribute to continuous improvement in performance and compliance.</p>	<p>Anchor College and Career Readiness--Reading: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.</p> <p>Anchor College and Career Readiness--Speaking and Listening: Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.</p> <p>Anchor College and Career Readiness--Reading: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.</p>	<p>Ch. 2.1.3: Identify safety procedures to protect the environment from contamination. Describe the information provided by the MSDS (Material Safety Data Sheet) in dealing with electronic equipment. Describe proper disposal procedures for batteries, toner kits, and other components.</p> <p>Ch. 10.4.3: Describe the call-escalation process by which a level-one technician translates a customer problem into a work order for a level-two technician to handle.</p> <p>Ch. 4.2.1: Explain the purpose of and liability issues involved with data protection.</p> <p>Ch. 10.3: Explain ethics and legal aspects of working with computer technology. Discuss privacy issues.</p>
<p>SCC07 Leadership & Teamwork</p>	<p>Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.</p>	<p>Anchor College and Career Readiness--Reading: Delineate then evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.</p> <p>Science/Technical Literacy: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible</p> <p>Anchor College and Career Readiness--Writing: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.</p>	<p>Ch. 10.2.7: Define and follow business policies designed to facilitate help desk functions and support customer satisfaction.</p> <p>Ch. 10.1: Develop career-related research skills by completing a research worksheet on troubleshooting resources for technicians.</p>
<p>SCC08 Ethics & Legal Responsibilities</p>	<p>Know and understand the importance of professional ethics and legal responsibilities.</p>	<p>Anchor College and Career Readiness--Reading: Analyze how and why individuals, events, and ideas develop and interact over the course of a text.</p> <p>Anchor College and Career Readiness--Language: Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p>	<p>Ch. 5.3.1: Identify applications and environments that are compatible with an operating system. Make OS recommendations based on budget constraints, projected use, and applications to be installed.</p> <p>Ch. 8.7.1: Explain cabled Ethernet standards, and be able to describe their capabilities and purposes.</p> <p>Ch. 1.4: Identify the names, purposes, and characteristics of internal components.</p> <p>Ch. 5.1.2: Explain operating system concepts; compare and contrast closely-related terms describing modes of operation, memory management, and processor architecture.</p>
<p>SCC09 Employability & Career Development</p>	<p>Know and understand the importance of employability skills. Explore, plan, and effectively manage careers. Know and understand the importance of entrepreneurship skills.</p>	<p>Anchor College and Career Readiness--Writing: Use technology, including the internet, to produce and publish writing and to interact and collaborate with others.</p>	<p>Ch. 6.7.2: Use the internet and other resources to locate specific laptop replacement parts. Evaluate the usefulness of websites, forums, and other technical resources used in the process.</p>
<p>SCC10 Technical Skills</p>	<p>Use the technical knowledge and skills required to pursue the targeted careers for all pathways in the career cluster, including knowledge of design, operation, and maintenance of technological systems critical to the career cluster.</p>	<p>Anchor College and Career Readiness--Reading: Analyze how and why individuals, events, and ideas develop and interact over the course of a text.</p> <p>Anchor College and Career Readiness--Language: Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p>	<p>Ch. 5.3.1: Identify applications and environments that are compatible with an operating system. Make OS recommendations based on budget constraints, projected use, and applications to be installed.</p> <p>Ch. 8.7.1: Explain cabled Ethernet standards, and be able to describe their capabilities and purposes.</p> <p>Ch. 1.4: Identify the names, purposes, and characteristics of internal components.</p> <p>Ch. 5.1.2: Explain operating system concepts; compare and contrast closely-related terms describing modes of operation, memory management, and processor architecture.</p> <p>Ch. 6.7.2: Use the internet and other resources to locate specific laptop replacement parts. Evaluate the usefulness of websites, forums, and other technical resources used in the process.</p>

Specific Examples of CCNA Discovery 1 Coursework Alignment to STEM and Common Core Standards

Comparison does not include all qualifying coursework; use as example only.

STEM Career Cluster: Engineering and Technology Pathway		Related Common Core Standards Science/Technical Literacy from "Next General Science"	Cisco Networking Academy Course Alignment: Sample Discovery 1 content demonstrating skills & standards
Cluster Knowledge & Skills Topics	Students preparing for STEM cluster careers should be able to demonstrate these skills		
SCC01 Academic Foundations	Achieve additional academic knowledge and skills required to pursue the full range of career and postsecondary education opportunities within a career cluster.	Anchor College and Career Readiness--Writing: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.	Ch. 4.5.6: Identify best practices to be used in working with cabling
SCC02 Communications	Use oral and written communication skills in creating, expressing, and interpreting information and ideas including technical terminology and information.	Anchor College and Career Readiness--Language: Demonstrate understanding of word relationships and nuances in word meanings. Anchor College and Career Readiness--Speaking and Listening: Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate. Anchor College and Career Readiness--Language: Demonstrate command of standard English grammar and usage when writing or speaking. Anchor College and Career Readiness--Language: Demonstrate command of standard English capitalization, punctuation, and spelling when writing.	Ch. 10 Capstone Project: Devise a technical solution for a small office environment Ch. 4.2.3: Interpret command outputs to learn more about how packets travel through the Internet. Ch. 10 Capstone Project: Gather relevant information through stakeholder interviews in order to devise a technical solution to a problem.
SCC03 Problem-Solving and Critical Thinking	Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.	Science/Technical Literacy: Follow precisely a complex multistep procedure. Mathematical Practice: Look for and make use of structure. Mathematical Practice: Reason abstractly and quantitatively. Mathematical Practice: Make sense of problems and persevere in solving them. Mathematical Practice: Use appropriate tools strategically. Mathematical Practice: Model with mathematics.	Ch. 9.3.4: Troubleshoot radio problems on a WLAN by manipulating channel configuration and host position to provide adequate bandwidth for the number of hosts. Ch. 1.3.1: Convert to binary ASCII code in order to represent numbers and characters digitally. Ch. 5.4.3: Configure a multi-function device as a DHCP server, and verify the configuration of public and private addresses through an examination of NAT functionality. Ch. 9.3.3: Troubleshoot and correct various connectivity problems related to cabling issues. Ch. 4.5.5: Calibrate and use cable testers to perform initial diagnostics, to create wire maps, and to correctly identify wiring faults.
SCC04 Information Technology Applications	Use information technology tools specific to the career cluster to access, manage, integrate, and create information.	Science/Technical Literacy: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible Science/Technical Literacy: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. Mathematical Practice: Attend to precision.	Ch. 1.3.2: Measure data storage capacity by converting values and units of measure. Ch. 2.3.3: Gather information needed for system maintenance and upgrades from examining operating system and application versions. Ch. 4.5.5: Use a punch down tool to terminate a UTP cable into an IDC and terminate UTP cable into an RJ-45 jack.
SCC05 Systems	Understand roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment. Identify how key	Anchor College and Career Readiness--Reading: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.	Ch. 8.4.3: Research, download and install a Security Vulnerability tester and use it to determine weaknesses in a host and the network. View and interpret the report. Ch. 9.4.2: Describe outside sources for help when troubleshooting, including colleagues, forums, and online interactive resources.

<p>SCC06 Safety, Health and Environmental</p>	<p>organizational systems affect organizational performance and the quality of products and services. Understand global context of industries and careers.</p>	<p>Ch. 4.1.1: Explain what the Internet is, and identify the contributions of major international organizations that help manage the Internet.</p>
<p>SCC07 Leadership and Teamwork</p>	<p>Understand the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance. Follow organizational policies and procedures and contribute to continuous improvement in performance and compliance.</p>	<p>Ch. 1.5.1: Describe potential hazards of ESD, and techniques to use to avoid damage to system components.</p>
<p>SCC08 Ethics and Legal Responsibilities</p>	<p>Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.</p>	<p>Ch. 8.4.2: Work in teams to configure access policies and DMZ settings, then test those policies and settings.</p> <p>Ch. 9.3.3: Work in teams to resolve a variety of troubleshooting problems, with each person taking the lead in half of the scenarios.</p>
<p>SCC09 Employability and Career Development</p>	<p>Know and understand the importance of professional ethics and legal responsibilities.</p> <p>Know and understand the importance of employability skills. Explore, plan, and effectively manage careers. Know and understand the importance of entrepreneurship skills.</p>	<p>Ch. 7.3.1: Explain the necessity for protecting wireless networks, and describe common WLAN vulnerabilities.</p> <p>Ch. 10 Capstone Project: Develop and communicate a security policy for a customer. Provide training to ensure that the policy is followed.</p>
<p>SCC10 Technical Skills</p>	<p>Use the technical knowledge and skills required to pursue the targeted careers for all pathways in the career cluster, including knowledge of design, operation, and maintenance of technological systems critical to the career cluster.</p>	<p>Ch. 4.1.1: Explain what the Internet is, and identify the contributions of major international organizations that help manage the Internet.</p> <p>Ch. 10 Capstone Project: Prepare documentation for sign-off from a customer, detailing performance and testing reports and configuration information.</p> <p>Ch. 4.1.5: Recommend the most appropriate ISP service level for an end-user.</p>
		<p>Ch. 5.4.1: Convert between binary and decimal numbers to calculate the number of hosts available with x number of bits in the host portion of the address.</p> <p>Ch. 2.1.3: Make recommendations for operating systems based on total cost of ownership.</p> <p>Ch. 6.3.2: Match host, protocol, and encapsulation terminology with the proper protocol or layer.</p> <p>Ch. 7.4.1: Determine through research and user interviews the wireless standard, layout, installation and security plan, and backup strategy for a WLAN.</p> <p>Ch. 3.5.7: Use Packet Tracer to model a simple network, observe network behavior, and collect and analyze network data.</p> <p>Ch. 6.3.3: Describe the Open Systems (OSI) Interconnect Model, and build an Ethernet frame with the proper components to send it to its destination.</p>

Specific Examples of CCNA Discovery 2 Coursework Alignment to STEM and Common Core Standards

Comparison does not include all qualifying coursework; use as example only.

STEM Career Cluster Engineering and Technology Pathway		Related Common Core Standards Science/Technical Literacy from "Next General Science"	Cisco Networking Academy Course Alignment: Sample Discovery 2 content demonstrating skills & standards
Cluster Knowledge & Skills Topics	Students preparing for STEM cluster careers should be able to demonstrate these skills		
SCC01 Academic Foundations	Achieve additional academic knowledge and skills required to pursue the full range of career and postsecondary education opportunities within a career cluster.	Anchor College and Career Readiness--Writing: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation. Anchor College and Career Readiness--Reading: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.	Ch. 2.2.2: Identify specific protocols and technologies related to each of the OSI layers in order to use the OSI model as a framework for troubleshooting. Ch. 9.6.1: Describe the entry-level Cisco certification process, and the topics found on the CCENT examination.
SCC02 Communications	Use oral and written communication skills in creating, expressing and interpreting information and ideas including technical terminology and information.	Anchor College and Career Readiness--Speaking and Listening: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing one's own clearly and persuasively. Anchor College and Career Readiness--Writing: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Ch. 8.2.5: Recommend an anti-X software package that meets the needs of a small business customer. Ch. 3.2.4: Evaluate a floor plan and propose upgrades to accommodate extra floor space. Ch. 3.1.3: Investigate a customer network, create a network inventory, and create a logical network diagram based on the data.
SCC03 Problem-Solving and Critical Thinking	Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.	Mathematical Practice: Look for and make use of structure. Mathematical Practice: Make sense of problems and persevere in solving them. Anchor College and Career Readiness--Language: Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	Ch. 6.1.2: Describe the distance and vector components of a distance vector routing algorithm, and apply the algorithm in selecting the shortest path. Ch. 2.3.1: Given a network connectivity problem, diagnose the problem, decide upon an appropriate plan of action, and use network utilities to resolve the problem. Ch. 9.6.5: Create and share practice questions when practicing test taking.
SCC04 Information Technology Applications	Use information technology tools specific to the career cluster to access, manage, integrate, and create information.	Anchor College and Career Readiness--Writing: Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences. Mathematical Practice: Reason abstractly and quantitatively. Anchor College and Career Readiness--Writing: Use technology, including the internet, to produce and publish writing and to interact and collaborate with others. Science/Technical Literacy: Follow precisely a complex multistep procedure. Mathematical Practices: Use appropriate tools strategically.	Ch. 8.3.2: Perform a network capture using Wireshark. Create a filter, then observe how the filter operates during a network capture. Ch. 7.3.1: Edit a HOSTS file in Windows, and use the contents of the file to map a name for easier resolution. Ch. 5.1.3: Demonstrate the command sequence for troubleshooting the router bootstrap process through ROMmonitor. Ch. 9.1.3: Compare the functions of cable testers, digital multimeters, and portable network analyzers in troubleshooting hardware issues.

<p>SCC05 Systems</p>	<p>Understand roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment. Identify how key organizational systems affect organizational performance and the quality of products and services. Understand global context of industries and careers.</p>	<p>Anchor College and Career Readiness--Reading: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.</p> <p>Anchor College and Career Readiness--Language: Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.</p> <p>Anchor College and Career Readiness--Reading: Analyze how and why individuals, events, and ideas develop and interact over the course of a text.</p>	<p>Ch. 2.1.1: Describe the three levels of customer support found at ISPs, and the hierarchy of support teams that work with medium to large businesses.</p> <p>Ch. 2.1.3: Identify characteristics of good customer support interaction.</p>
<p>SCC06 Safety, Health and Environmental</p>	<p>Understand the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance. Follow organizational policies and procedures and contribute to continuous improvement in performance and compliance.</p>	<p>Anchor College and Career Readiness--Speaking and Listening: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.</p> <p>Science/Technical Literacy: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>	<p>Ch. 2.3.3: Describe the safe use of ladders and harnesses when accessing equipment and cables located in high or dangerous locations.</p> <p>Ch. 3.1.1: Identify existing network conditions that compromise safety regulations and should be noted during a site survey.</p>
<p>SCC07 Leadership and Teamwork</p>	<p>Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.</p>	<p>Anchor College and Career Readiness--Speaking and Listening: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing one's own clearly and persuasively.</p>	<p>Ch. 5.1.2: Employ safety and procedural best practices to prevent accidental damage to ISR equipment during installation.</p> <p>Ch. 9.6.4: Form a study group when preparing for Cisco certification, and assign members different responsibilities.</p>
<p>SCC08 Ethics and Legal Responsibilities</p>	<p>Know and understand the importance of professional ethics and legal responsibilities.</p>	<p>Science/Technical Literacy: Follow precisely a complex multistep procedure.</p> <p>Science/Technical Literacy: Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p>	<p>Ch. 8.1.3: Use Windows NTFS permissions to set up secure data sharing, and educate end-users on how to recognize a secured website versus an illegitimate unsecured one.</p> <p>Ch. 1.3.2: Describe the roles and responsibilities of the various teams and departments which deliver ISP services to customers.</p>
<p>SCC09 Employability and Career Development</p>	<p>Know and understand the importance of employability skills. Explore, plan, and effectively manage careers. Know and understand the importance of entrepreneurship skills.</p>	<p>Anchor College and Career Readiness--Reading: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.</p> <p>Anchor College and Career Readiness--Language: Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.</p> <p>Anchor College and Career Readiness--Speaking and Listening: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.</p>	<p>Ch. 2.1.3: Describe the customer support process, and identify the elements of each step of providing customer support.</p> <p>Ch. 10.0.1: Play the role of an on-site installation and support technician from an ISP as you implement a network upgrade.</p>
<p>SCC10 Technical Skills</p>	<p>Use the technical knowledge and skills required to pursue the targeted careers for all pathways in the career cluster, including knowledge of design, operation, and maintenance of technological systems critical to the career cluster.</p>	<p>Mathematical Practice: Look for and make use of structure.</p> <p>Mathematical Practice: Use appropriate tools strategically.</p> <p>Anchor College and Career Readiness--Reading: Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.</p> <p>Anchor College and Career Readiness--Writing: Draw evidence from literary or informational texts to support analysis, reflection, and research.</p>	<p>Ch. 6.1.2: Based on the outputs of routing tables, create a network topology.</p> <p>Ch. 5.1.4: Demonstrate the ability to perform configuration and monitoring tasks using out-of-band and in-band management tools.</p> <p>Ch. 7.2.3: Distinguish between TCP and UDP</p> <p>Ch. 8.4.2: Evaluate current and future needs, and plan a backup solution for a small company.</p>

Specific Examples of CCNA Discovery 3 Coursework Alignment to STEM and Common Core Standards

Comparison does not include all qualifying coursework; use as example only.

STEM Career Cluster Engineering and Technology Pathway		Related Common Core Standards Science/Technical Literacy from "Next General Science"	Cisco Networking Academy Course Alignment: Sample Discovery 3 content demonstrating skills & standards
Cluster Knowledge & Skills Topics	Students preparing for STEM cluster careers should be able to demonstrate these skills		
SCC01 Academic Foundations	Achieve additional academic knowledge and skills required to pursue the full range of career and postsecondary education opportunities within a career cluster.	Mathematical Practice: Look for and make use of structure. Anchor College and Career Readiness--Reading: Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words Anchor College and Career Readiness--Reading: Deeminate then evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence. Anchor College and Career Readiness--Language: Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	Ch. 3.5.4: Describe best practices in designing VLANs to provide security, conserve bandwidth, and localize traffic on an enterprise network. Ch. 10: Analyze the contents of a customer work order Ch. 8.5.2: Analyze router logs to determine whether traffic is meeting requirements. Ch. 5.3.3: Use knowledge of EIGRP terminology to determine which EIGRP table would contain specified information. Ch. 1.2.3: Match traffic prioritization terminology with definitions in order to describe management of enterprise network communications.
SCC02 Communications	Use oral and written communication skills in creating, expressing and interpreting information and ideas including technical terminology and information.	Anchor College and Career Readiness--Speaking and Listening: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience. Anchor College and Career Readiness--Reading: Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.	Ch. 2.2.2: Prepare a presentation designed to educate end-users about common network attacks. Ch. 6.3.4: Examine a routing table in a multi-protocol enterprise, and from it determine various route sources, administrative distances, and metrics. Ch. 6.1.2: Calculate the path taken by OSPF using link cost metrics. Ch. 8.4.5: Compose, configure, and analyze ACLs designed to filter inter-VLAN traffic.
SCC03 Problem-Solving and Critical Thinking	Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.	Mathematical Practice: Model with mathematics Anchor College and Career Readiness--Writing: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. Anchor College and Career Readiness--Reading: Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.	Ch. 9.3.1: Analyze outputs in order to troubleshoot RIPv2 routing issues. Ch. 6.1.1: Compare the algorithms used by distance vector and link state routing protocols in selecting the best route to a destination. Identify characteristics of both types of protocols. Ch. 1.2.2: Use a packet capture program to analyze network traffic.
SCC04 Information Technology Applications	Use information technology tools specific to the career cluster to access, manage, integrate, and create information.	Science/Technical Literacy: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. Anchor College and Career Readiness--Reading: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.	Ch. 2.1.1: Describe the main types of network documentation and where they should be stored. Ch. 8.5.2: Download and use a syslog server to record and analyze ACL activity. Use the results to troubleshoot problems with ACL placement and configuration.
SCC05	Understand roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment. Identify how key	Anchor College and Career Readiness--Reading: Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.	Ch. 1.3.1: Explain the technological, physical and personnel advantages and constraints of teleworking, and decide if teleworking is an appropriate solution in a given scenario.

Systems	organizational systems affect organizational performance and the quality of products and services. Understand global context of industries and careers.	Anchor College and Career Readiness--Speaking and Listening: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.	Ch. 9.3.3: Assume the role of a network administrator as you work through the procedure to troubleshoot OSPF configuration errors.
SCC06 Safety, Health and Environmental	Understand the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance. Follow organizational policies and procedures and contribute to continuous improvement in performance and compliance.	Anchor College and Career Readiness--Writing: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.	Ch. 2.1.2: Describe best practices in the safe installation and maintenance of structured cabling.
SCC07 Leadership and Teamwork	Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.	Anchor College and Career Readiness--Reading: Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.	Ch. 2.1.2: Describe procedures and facilities needed in a Network Operations Center to provide a safe environment for critical equipment.
SCC08 Ethics and Legal Responsibilities	Know and understand the importance of professional ethics and legal responsibilities.	Anchor College and Career Readiness--Writing: Draw evidence from literary or informational texts to support analysis, reflection, and research.	Ch. 7.2.4: Explain the importance of password protection of WAN links in providing data security.
SCC09 Employability and Career Development	Know and understand the importance of employability skills. Explore, plan, and effectively manage careers. Know and understand the importance of entrepreneurship skills.	Anchor College and Career Readiness--Writing: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.	Ch. 2.1.3: Explain the impact of new privacy legislation on securing the telecommunications room.
SCC10 Technical Skills	Use the technical knowledge and skills required to pursue the targeted careers for all pathways in the career cluster, including knowledge of design, operation, and maintenance of technological systems critical to the career cluster.	Anchor College and Career Readiness--Reading: Delimitate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.	Ch. 1.1.4: Describe design solutions enabling businesses to provide privileged network access to key suppliers and customers through VPNs, extranets and intranets.
		Anchor College and Career Readiness--Writing: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Ch. 1.3.1: Identify scenarios where telecommuting and teleworking are appropriate.
		Anchor College and Career Readiness--Writing: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Ch. 3.5.4: Plan, design, and build the prototype for an enterprise network using multiple VLANs, inter-VLAN routing, and multiple VTP domains. Verify that the resulting design meets company standards and adheres to VLAN best practices.
		Anchor College and Career Readiness--Writing: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Ch. 8.3.6: Plan, configure, and verify standard, extended, and named Access Control Lists (ACLs).
		Anchor College and Career Readiness--Writing: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Ch. 3.2.3: Configure the BID on a switch to control which switch becomes the root bridge. Observe the spanning-tree and traffic flow patterns as different switches are configured as root. Determine the most efficient design.

Specific Examples of CCNA Discovery 4 Coursework Alignment to STEM and Common Core Standards

Comparison does not include all qualifying coursework; use as example only.

STEM Career Cluster Engineering and Technology Pathway		Related Common Core Standards Science/Technical Literacy from "Next General Science"	Cisco Networking Academy Course Alignment: Sample Discovery 4 content demonstrating skills & standards
Cluster Knowledge & Skills Topics	Students preparing for STEM cluster careers should be able to demonstrate these skills		
SCC01 Academic Foundations	Achieve additional academic knowledge and skills required to pursue the full range of career and postsecondary education opportunities within a career cluster.	Anchor College and Career Readiness--Writing: Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. Anchor College and Career Readiness--Reading: Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole. Anchor College and Career Readiness--Writing: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation. Anchor College and Career Readiness--Writing: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content Anchor College and Career Readiness--Language: Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	Ch. 9.1.1: Organize and edit existing information in order to develop an outline for a project proposal. Ch. 3.5.4: Given a list of stated business goals, match each goal to the technical requirements necessary to meet it as part of the network design process. Ch. 10.0.2: Research networking jobs that match your skills, strengths, and interests. Ch. 9.4.1: Compile implementation and costing information and integrate it into project proposal documentation. Ch. 2.1.3: Create a Project Plan by evaluating the current network, factoring in the resource limits, cost, and other constraints established by the business goals. Ch. 8.2.3: Match frame relay terminology to definitions to describe how frame relay processes information across a WAN.
SCC02 Communications	Use oral and written communication skills in creating, expressing and interpreting information and ideas including technical terminology and information.	Anchor College and Career Readiness--Speaking and Listening: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. Anchor College and Career Readiness--Writing: Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. Anchor College and Career Readiness--Language: Demonstrate command of standard English grammar and usage when writing or speaking. Anchor College and Career Readiness--Language: Demonstrate command of standard English capitalization, punctuation, and spelling when writing.	Ch. 2.3.3: Gather information about business goals from stakeholder interviews and other sources, and use the information to produce and prioritize a checklist of project goals. Ch. 9.1.1: Organize and edit existing information in order to develop an outline for a project proposal. Ch. 3.5.5: As part of new network design requirements, produce a document which analyzes the current network against project technical requirements. The document should be suitable for use in gaining authorization from the client for work to continue on
SCC03 Problem-Solving and Critical Thinking	Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.	Mathematical Practice: Reason abstractly and quantitatively. Mathematical Practice: Model with mathematics. Mathematical Practice: Reason abstractly and quantitatively. Mathematical Practice: Model with mathematics. Mathematical Practice: Reason abstractly and quantitatively. Mathematical Practice: Use appropriate tools strategically.	Ch. 5.1.2: Calculate the requirements for scalability in a given network design scenario. Adjust requirements to compensate for underestimation of scaling requirements. Ch. 7.2.3: Test redundancy in a network design by simulating failures in the switched and routed portions of the design and observing recovery. Ch. 6.2.1: Based on network requirements, design an addressing solution that meets customer needs as well as managed growth. Ch. 4.5.2: Using NetFlow, diagram internal (intranet) traffic flows to determine application impact on the network design. Ch. 3.4.3: Using NetStumbler, perform a WLAN site survey designed to measure signal strength as an access point is moved from location to location. Ch. 4.1.2: Identify and describe tools used as part of a network audit. Use NetFlow to characterize network applications being used on a network.
SCC04 Information Technology Applications	Use information technology tools specific to the career cluster to access, manage, integrate, and create information. Understand roles within teams, work units,	Anchor College and Career Readiness--Speaking and Listening: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.	Ch. 2.2.2: Describe the participation and contributions of all members of the network design team at pre-bid meetings.

<p>SCC05 Systems</p>	<p>departments, organizations, inter-organizational systems, and the larger environment. Identify how key organizational systems affect organizational performance and the quality of products and services. Understand global context of industries and careers.</p>	<p>Science/Technical Literacy: Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p> <p>Anchor College and Career Readiness--Speaking and Listening: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.</p> <p>Anchor College and Career Readiness--Reading: Describe today's increasing network security threats and explain the need to implement a comprehensive security policy to mitigate the threats.</p> <p>Anchor College and Career Readiness--Reading: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.</p> <p>Anchor College and Career Readiness--Reading: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.</p> <p>Anchor College and Career Readiness--Speaking and Listening: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.</p> <p>Anchor College and Career Readiness--Language: Demonstrate understanding of word relationships and nuances in word meanings.</p> <p>Anchor College and Career Readiness--Writing: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>Anchor College and Career Readiness--Speaking and Listening: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.</p> <p>Anchor College and Career Readiness--Writing: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.</p> <p>Anchor College and Career Readiness--Writing: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.</p> <p>Anchor College and Career Readiness--Reading: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.</p>	<p>Ch. 2.3.2: Create a network organization structure of a client company, including all stakeholders in the structure.</p> <p>Ch. 9.1.2: Describe how existing information from team members is integrated into a final project proposal.</p>
<p>SCC06 Safety, Health and Environmental</p>	<p>Understand the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance. Follow organizational policies and procedures and contribute to continuous improvement in performance and compliance.</p>	<p>Ch. 1.4.6: Describe today's increasing network security threats and explain the need to implement a comprehensive security policy to mitigate the threats; demonstrate the risks of allowing physical access to network devices.</p> <p>Ch. 3.4.1: Describe safety guidelines to be followed when visiting customer sites for site surveys.</p> <p>Ch. 3.3.3: State safety procedures to be used when installing new hardware options.</p>	<p>Ch. 1.4.6: Describe today's increasing network security threats and explain the need to implement a comprehensive security policy to mitigate the threats; demonstrate the risks of allowing physical access to network devices.</p> <p>Ch. 3.4.1: Describe safety guidelines to be followed when visiting customer sites for site surveys.</p> <p>Ch. 3.3.3: State safety procedures to be used when installing new hardware options.</p>
<p>SCC07 Leadership and Teamwork</p>	<p>Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.</p>	<p>Ch. 2.4.1: Discuss with peers the range of technical requirements that could be employed to meet customer goals. From the discussion, produce a list of technical requirements for the project proposal.</p> <p>Ch. 5.2.3.3 : Brainstorm with other students to identify weaknesses in a core layer design proposal.</p>	<p>Ch. 2.4.1: Discuss with peers the range of technical requirements that could be employed to meet customer goals. From the discussion, produce a list of technical requirements for the project proposal.</p> <p>Ch. 5.2.3.3 : Brainstorm with other students to identify weaknesses in a core layer design proposal.</p>
<p>SCC08 Ethics and Legal Responsibilities</p>	<p>Know and understand the importance of professional ethics and legal responsibilities.</p>	<p>Ch. 2.2.3: Describe the importance of understanding legal contractual terms and conditions in RFPs.</p> <p>Ch. 2.4.1: Use business goals to prioritize the technical requirements for a network.</p>	<p>Ch. 2.2.3: Describe the importance of understanding legal contractual terms and conditions in RFPs.</p> <p>Ch. 2.4.1: Use business goals to prioritize the technical requirements for a network.</p>
<p>SCC09 Employability and Career Development</p>	<p>Know and understand the importance of employability skills. Explore, plan, and effectively manage careers. Know and understand the importance of entrepreneurship skills.</p>	<p>Ch. 9.4.2: Deliver a network project proposal presentation to a group of peers. Demonstrate knowledge of the project details and employ salesmanship skills. Respond appropriately to audience questions.</p> <p>Ch. 10.0.2: Create and submit a resume with cover letter for a networking job in which you are interested.</p> <p>Ch. 5.5.3: Given a security policy, develop a firewall rule set and implement Access Control Lists to enforce the rule set.</p>	<p>Ch. 9.4.2: Deliver a network project proposal presentation to a group of peers. Demonstrate knowledge of the project details and employ salesmanship skills. Respond appropriately to audience questions.</p> <p>Ch. 10.0.2: Create and submit a resume with cover letter for a networking job in which you are interested.</p> <p>Ch. 5.5.3: Given a security policy, develop a firewall rule set and implement Access Control Lists to enforce the rule set.</p>
<p>SCC10 Technical Skills</p>	<p>Use the technical knowledge and skills required to pursue the targeted careers for all pathways in the career cluster, including knowledge of design, operation, and maintenance of technological systems critical to the career cluster.</p>	<p>Ch. 8.2.6: Analyze the results of a prototype test and document any risks or weaknesses in the design.</p> <p>Ch. 1.1.3: Describe the three basic steps of network design. Determine the scope of a project by deciding whether a given design requirement will affect an entire network, or a portion of a network.</p> <p>Ch. 2.1.1: Describe the six phases of Cisco Lifecycle Services (PPDIOO), and apply them to a case study.</p> <p>Ch. 9.2.4: Create a Bill of Material, including equipment costs, maintenance support, and service costs.</p> <p>Ch. 9.4.2: Present and defend a network project proposal presentation to a group of peers.</p>	<p>Ch. 8.2.6: Analyze the results of a prototype test and document any risks or weaknesses in the design.</p> <p>Ch. 1.1.3: Describe the three basic steps of network design. Determine the scope of a project by deciding whether a given design requirement will affect an entire network, or a portion of a network.</p> <p>Ch. 2.1.1: Describe the six phases of Cisco Lifecycle Services (PPDIOO), and apply them to a case study.</p> <p>Ch. 9.2.4: Create a Bill of Material, including equipment costs, maintenance support, and service costs.</p> <p>Ch. 9.4.2: Present and defend a network project proposal presentation to a group of peers.</p>