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

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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	Administrators	State / Federal
1. Identify relevant STEM Education program that engages students	1. Document how instruction is relevant to community and industry expectations	1. Document program relevance for state- and national-level educational initiatives
2. Plan lessons that meet standards recognized by business and industry	2. Monitor knowledge and skills development for continuous improvement	2. Recognize the contribution of Networking Academy curricula to national educational reform
3. Identify opportunities for interdisciplinary teaching to reinforce critical skills across disciplines	3. Identify, observe and evaluate curricula that enacts standards-based instruction	3. Observe and evaluate how teachers and students actually respond to standards-based instruction
4. Integrate content and activities that help students master STEM skills and Common Core Standards	4. Provide engaging, relevant, career-oriented reinforcement of academic standards	4. Document curricula and instruction that supports strategies and plans related to discretionary grant process
5. Track completion of STEM career cluster knowledge and skills topics necessary for future education and employment	5. Support interdisciplinary instruction across academic, career and technology programs	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

Cisco Networking Academy Courses	**SCC01** Academic Foundations	**SCC02** Communica-tions	**SCC03** Problem-Solving & Critical Thinking	**SCC04** Information Technology Applications	**SCC05** Systems	**SCC06** Safety, Health & Environmental	**SCC07** Leadership and Teamwork	**SCC08** Ethics & Legal Responsi-bilities	**SCC09** Employability & Career Development	**SCC10** Technical Skills
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.	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: 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. 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.
		Anchor College and Career Readiness--Speaking and Listening: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally	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.
		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.	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: Follow precisely a complex multistep procedure.	Ch. 3: Complete assembly of a PC, following best practices and procedures.
		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.	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.
		Mathematical Practice: Make sense of problems and persevere in solving them.	Ch. 2.3.4: Disassemble a computer, using proper tools and procedures.
		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. 3.2: Using both the Virtual Desktop PC and hands-on lab, install a power supply.
		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.	Ch. 7.4.2: Locate, download and install software upgrades for an all-in-one device
		Mathematical Practice: Construct viable arguments and critique the reasoning of others.	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.

		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.	Ch. 8.8: Explain OSI and TCP/IP data models. Identify relationships between the two models through a matching activity.
SCC05 Systems	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.	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. 10.4.1: Describe the call center environment. Describe and compare the responsibilities of level-one and level-two technicians. Ch. 9.3.1: Explain what is required in a basic local security policy; describe the role of employee training in observing the policy.
SCC06 Safety, Health & 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--Reading: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.	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.
SCC07 Leadership & Teamwork	Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.	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.	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.
SCC08 Ethics & Legal Responsibilities	Know and understand the importance of professional ethics and legal responsibilities.	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. 4.2.1: Explain the purpose of and liability issues involved with data protection.
		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.	Ch. 10.3: Explain ethics and legal aspects of working with computer technology. Discuss privacy issues.
SCC09 Employability & Career Development	Know and understand the importance of employability skills. Explore, plan, and effectively manage careers. Know and understand the importance of entrepreneurship skills.	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	Ch. 10.2.7: Define and follow business policies designed to facilitate help desk functions and support customer satisfaction.
		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. 10.1: Develop career-related research skills by completing a research worksheet on troubleshooting resources for technicians.
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.	Mathematical Practice: Reason abstractly and quantitatively.	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.
		Anchor College and Career Readiness--Reading: Analyze how and why individuals, events, and ideas develop and interact over the course of a text.	Ch. 8.7.1: Explain cabled Ethernet standards, and be able to describe their capabilities and purposes.
		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. 1.4: Identify the names, purposes, and characteristics of internal components. Ch. 5.1.2: Explain operating system concepts; compare and contrast closely-related terms describing modes of operation, memory management, and processor architecture.
		Anchor College and Career Readiness--Writing: Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.	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.

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 Ch. 10 Capstone Project: Devise a technical solution for a small office environment
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.	Ch. 4.2.3: Interpret command outputs to learn more about how packets travel through the Internet.
		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.	Ch. 10 Capstone Project: Gather relevant information through stakeholder interviews in order to devise a technical solution to a problem.
		Anchor College and Career Readiness--Language: Demonstrate command of standard English grammar and usage when writing or speaking.	Ch. 10 Capstone Project: Prepare and present a technical report to a diverse group.
		Anchor College and Career Readiness--Language: Demonstrate command of standard English capitalization, punctuation, and spelling when writing.	
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.	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.
		Mathematical Practice: Look for and make use of structure.	Ch. 1.3.1: Convert to binary ASCII code in order to represent numbers and characters digitally.
		Mathematical Practice: Reason abstractly and quantitatively.	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.
		Mathematical Practice: Make sense of problems and persevere in solving them.	Ch. 9.3.3: Troubleshoot and correct various connectivity problems related to cabling issues.
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. 4.5.5: Calibrate and use cable testers to perform initial diagnostics, to create wire maps, and to correctly identify wiring faults.
		Mathematical Practice: Model with mathematics.	Ch. 1.3.2: Measure data storage capacity by converting values and units of measure.
		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	Ch. 2.3.3: Gather information needed for system maintenance and upgrades from examining operating system and application versions.
		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.	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.
		Mathematical Practice: Attend to precision.	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.
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. 9.4.2: Describe outside sources for help when troubleshooting, including colleagues, forums, and online interactive resources.

	organizational systems affect organizational performance and the quality of products and services. Understand global context of industries and careers.	Anchor College and Career Readiness--Reading: Analyze how and why individuals, events, and ideas develop and interact over the course of a text.	Ch. 4.1.1: Explain what the Internet is, and identify the contributions of major international organizations that help manage the Internet.
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--Reading: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.	Ch. 1.5.1: Describe potential hazards of ESD, and techniques to use to avoid damage to system components.
SCC07 Leadership and Teamwork	Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.	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.	Ch. 8.4.2: Work in teams to configure access policies and DMZ settings, then test those policies and settings.
		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.	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.
SCC08 Ethics and Legal Responsibilities	Know and understand the importance of professional ethics and legal responsibilities.	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. 7.3.1: Explain the necessity for protecting wireless networks, and describe common WLAN vulnerabilities.
		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.	Ch. 10 Capstone Project: Develop and communicate a security policy for a customer. Provide training to ensure that the policy is followed.
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--Reading: Read and comprehend complex literary and informational texts independently and proficiently.	Ch. 4.1.1: Explain what the Internet is, and identify the contributions of major international organizations that help manage the Internet. Ch. 10 Capstone Project: Prepare documentation for sign-off from a customer, detailing performance and testing reports and configuration information.
		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.	Ch. 4.1.5: Recommend the most appropriate ISP service level for an end-user.
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.	Mathematical Practice: Reason abstractly and quantitatively.	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.
		Anchor College and Career Readiness--Reading: Analyze how and why individuals, events, and ideas develop and interact over the course of a text.	Ch. 2.1.3: Make recommendations for operating systems based on total cost of ownership.
		Anchor College and Career Readiness--Language: Demonstrate understanding of word relationships and nuances in word meanings.	Ch. 6.3.2: Match host, protocol, and encapsulation terminology with the proper protocol or layer.
		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.	Ch. 7.4.1: Determine through research and user interviews the wireless standard, layout, installation and security plan, and backup strategy for a WLAN.
		Mathematical Practice: Look for and express regularity in repeated reasoning.	Ch. 3.5.7: Use Packet Tracer to model a simple network, observe network behavior, and collect and analyze network data.
		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. 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.

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.	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.
		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. 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.	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.
		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. 3.1.3: 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.	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.
		Mathematical Practice: Make sense of problems and persevere in solving them.	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.
		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. 9.6.5: Create and share practice questions when practicing test taking.
		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.	
SCC04 Information Technology Applications	Use information technology tools specific to the career cluster to access, manage, integrate, and create information.	Mathematical Practice: Reason abstractly and quantitatively.	Ch. 8.3.2: Perform a network capture using Wireshark. Create a filter, then observe how the filter operates during a network capture.
		Anchor College and Career Readiness--Writing: Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.	Ch. 7.3.1: Edit a HOSTS file in Windows, and use the contents of the file to map a name for easier resolution.
		Science/Technical Literacy: Follow precisely a complex multistep procedure.	Ch. 5.1.3: Demonstrate the command sequence for troubleshooting the router bootup process through ROMmonitor.
		Mathematical Practices: Use appropriate tools strategically.	Ch. 9.1.3: Compare the functions of cable testers, digital multimeters, and portable network analyzers in troubleshooting hardware issues.

SCC05 Systems	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.	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. 2.1.1: Describe the three levels of customer support found at ISPs, and the hierarchy of support teams that work with medium to large businesses.
		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.	Ch. 2.1.3: Identify characteristics of good customer support interaction.
		Anchor College and Career Readiness--Reading: Analyze how and why individuals, events, and ideas develop and interact over the course of a text.	Ch. 4.1.1: Describe the impact of the Internet Engineering Task Force on the development of private address space.
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--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.	Ch. 2.3.3: Describe the safe use of ladders and harnesses when accessing equipment and cables located in high or dangerous locations. Ch. 3.1.1: Identify existing network conditions that compromise safety regulations and should be noted during a site survey.
		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.	Ch. 5.1.2: Employ safety and procedural best practices to prevent accidental damage to ISR equipment during installation.
SCC07 Leadership and Teamwork	Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.	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. 9.6.4: Form a study group when preparing for Cisco certification, and assign members different responsibilities.
SCC08 Ethics and Legal Responsibilities	Know and understand the importance of professional ethics and legal responsibilities.	Science/Technical Literacy: Follow precisely a complex multistep procedure.	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.
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.	Science/Technical Literacy: Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.	Ch. 1.3.2: Describe the roles and responsibilities of the various teams and departments which deliver ISP services to customers.
		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. 2.1.3: Describe the customer support process, and identify the elements of each step of providing customer support.
		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.	Ch. 10.0.1: Play the role of an on-site installation and support technician from an ISP as you implement a network upgrade.
		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.	
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.	Mathematical Practice: Look for and make use of structure.	Ch. 6.1.2: Based on the outputs of routing tables, create a network topology.
		Mathematical Practice: Use appropriate tools strategically.	Ch. 5.1.4: Demonstrate the ability to perform configuration and monitoring tasks using out-of-band and in-band management tools.
		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. 7.2.3: Distinguish between TCP and UDP
		Anchor College and Career Readiness--Writing: Draw evidence from literary or informational texts to support analysis, reflection, and research.	Ch. 8.4.2: Evaluate current and future needs, and plan a backup solution for a small company.

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.	Ch. 3.5.4: Describe best practices in designing VLANs to provide security, conserve bandwidth, and localize traffic on an enterprise network.
		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. 10: Analyze the contents of a customer work order
		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.	Ch. 8.5.2: Analyze router logs to determine whether traffic is meeting requirements.
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: 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. 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.
		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.	Ch. 2.2.2: Prepare a presentation designed to educate end-users about common network attacks.
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.	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. 6.3.4: Examine a routing table in a multi-protocol enterprise, and from it determine various route sources, administrative distances, and metrics.
		Mathematical Practice: Model with mathematics	Ch. 6.1.2: Calculate the path taken by OSPF using link cost metrics.
		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.	Ch. 8.4.5: Compose, configure, and analyze ACLs designed to filter inter-VLAN traffic.
		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.
		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	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.
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--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. 1.2.2: Use a packet capture program to analyze network traffic.
		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.	Ch. 2.1.1: Describe the main types of network documentation and where they should be stored.
		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.	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.
		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.
SCC07 Leadership and Teamwork	Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.	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. 5.1.2: Work as a design team to create redundant links to minimize future network outages.
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.
		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.
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.	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.	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--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: Identify scenarios where telecommuting and teleworking are appropriate.
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.	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.	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).
		Mathematical Practice: Reason abstractly and quantitatively.	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.	Ch. 9.1.1: Organize and edit existing information in order to develop an outline for a project proposal.
		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.	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.
		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. 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.
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--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. 2.1.3: Create a Project Plan by evaluating the current network, factoring in the resource limits, cost, and other constraints established by the business goals.
		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. 8.2.3: Match frame relay terminology to definitions to describe how frame relay processes information across a WAN.
		Anchor College and Career Readiness--Speaking and Listening: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.	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.
		Anchor College and Career Readiness--Writing: Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.	Ch. 9.1.1: Organize and edit existing information in order to develop an outline for a project proposal.
		Anchor College and Career Readiness--Language: Demonstrate command of standard English grammar and usage when writing or speaking.	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
		Anchor College and Career Readiness--Language: Demonstrate command of standard English capitalization, punctuation, and spelling when writing.	
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.	Ch. 5.1.2: Calculate the requirements for scalability in a given network design scenario. Adjust requirements to compensate for underestimation of scaling requirements.
		Mathematical Practice: Model with mathematics.	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.
		Mathematical Practice: Reason abstractly and quantitatively.	Ch. 6.2.1: Based on network requirements, design an addressing solution that meets customer needs as well as managed growth.
SCC04 Information Technology Applications	Use information technology tools specific to the career cluster to access, manage, integrate, and create information.	Mathematical Practice: Model with mathematics.	Ch. 4.5.2: Using NetFlow, diagram internal (intranet) traffic flows to determine application impact on the network design.
		Mathematical Practice: Reason abstractly and quantitatively.	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.
		Mathematical Practice: Use appropriate tools strategically.	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.
	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.

SCC05 Systems	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.	Science/Technical Literacy: Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.	Ch. 2.3.2: Create a network organization structure of a client company, including all stakeholders in the structure.
		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. 9.1.2: Describe how existing information from team members is integrated into a final project proposal.
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--Reading: Describe today's increasing network security threats and explain the need to implement a comprehensive security policy to mitigate the threats.	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.
		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. 3.4.1: Describe safety guidelines to be followed when visiting customer sites for site surveys.
		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. 3.3.3: State safety procedures to be used when installing new hardware options.
SCC07 Leadership and Teamwork	Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.	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. 2.4.1: 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. Ch. 5.2.3.3 : Brainstorm with other students to identify weaknesses in a core layer design proposal.
SCC08 Ethics and Legal Responsibilities	Know and understand the importance of professional ethics and legal responsibilities.	Anchor College and Career Readiness--Language: Demonstrate understanding of word relationships and nuances in word meanings.	Ch. 2.2.3: Describe the importance of understanding legal contractual terms and conditions in RFPs.
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: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Ch. 2.4.1: Use business goals to prioritize the technical requirements for a network.
		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.	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.
		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. 10.0.2: Create and submit a resume with cover letter for a networking job in which you are interested.
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--Writing: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.	Ch. 5..5.3: Given a security policy, develop a firewall rule set and implement Access Control Lists to enforce the rule set.
		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. 8.2.6: Analyze the results of a prototype test and document any risks or weaknesses in the design.
		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.	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.
		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. 2.1.1: Describe the six phases of Cisco Lifecycle Services (PPDIOO), and apply them to a case study.
		Mathematical Practice: Reason abstractly and quantitatively.	Ch. 9.2.4: Create a Bill of Material, including equipment costs, maintenance support, and service costs.
		Anchor College and Career Readiness--Language: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	Ch. 9.4.2: Present and defend a network project proposal presentation to a group of peers.