Information Technology Career Cluster
Networking Systems and Support
Course Number: 11.46200

Course Description:
Wireless? Wired? How do you communicate? Now that students know the fundamental basics, they can apply their skills to connect to the network. Students will apply a variety of fundamental skills utilized in entry-level computer network systems administration positions. Exposure to various aspects of network hardware and software maintenance and monitoring, configuring and supporting a local area network (LAN) and a wide area network (WAN), Internet systems and segments of network systems will allow students to develop a strong knowledge base for networking systems and support. Students will be involved in designing, implementing, upgrading, managing, and working with networks and network technologies.

Various forms of technologies will be used to expose students to resources, software, and applications of networking. Professional communication skills and practices, problem-solving, ethical and legal issues, and the impact of effective presentation skills are enhanced in this course to prepare students to be college and career ready. Employability skills are integrated into activities, tasks, and projects throughout the course standards to demonstrate the skills required by business and industry. Competencies in the co-curricular student organization, Future Business Leaders of America (FBLA), are integral components of the employability skills standard for this course.

Networking Systems & Support is the third course in the Networking pathway in the Information Technology cluster. Students enrolled in this course should have successfully completed Introduction to Digital Technology and Networking Fundamentals course. After mastery of the standards in this course, students should be prepared to take the end of pathway assessment in this career area.

Course Standard 1

IT-NSS-1
The following standard is included in all CTAE courses adopted for the Career Cluster/Pathways. Teachers should incorporate the elements of this standard into lesson plans during the course. The topics listed for each element of the standard may be addressed in differentiated instruction matching the content of each course. These elements may also be addressed with specific lessons from a variety of resources. This content is not to be treated as a unit or separate body of knowledge but rather integrated into class activities as applications of the concept.

Standard: Demonstrate employability skills required by business and industry.
The following elements should be integrated throughout the content of this course.

1.1 Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.

Person-to-Person Etiquette	Telephone and Email Etiquette	Cell Phone and Internet Etiquette	Communicating At Work	Listening
Interacting with Your Boss	Telephone Conversations	Using Blogs	Improving Communication Skills	Reasons, Benefits, and Barriers
Interacting with Subordinates	Barriers to Phone conversations	Using Social Media	Effective Oral Communication	Listening Strategies
Interacting with Co-workers	Making and Returning Calls		Effective Written Communication	Ways We Filter What We Hear
Interacting with Suppliers	Making Cold Calls		Effective Nonverbal Skills	Developing a Listening Attitude
	Handling Conference Calls		Effective Word Use	Show You Are Listening
	Handling Unsolicited Calls		Giving and Receiving Feedback	Asking Questions

				Obtaining Feedback
				Getting Others to Listen

Nonverbal Communication	Written Communication	Speaking	Applications and Effective Résumés
Communicating Nonverbally	Writing Documents	Using Language Carefully	Completing a Job Application
Reading Body Language and mixed Messages	Constructive Criticism in Writing	One-on-One Conversations	Writing a Cover Letter
Matching Verbal and Nonverbal communication		Small Group Communication	Things to Include in a Résumé
Improving Nonverbal Indicators		Large Group Communication	Selling Yourself in a Résumé
Nonverbal Feedback		Making Speeches	Terms to Use in a Résumé
Showing Confidence Nonverbally		Involving the Audience	Describing Your Job Strengths
Showing Assertiveness		Answering Questions	Organizing Your Résumé
		Visual and Media Aids	Writing an Electronic Résumé
		Errors in Presentation	Dressing Up Your Résumé

1.2 Demonstrate creativity by asking challenging questions and applying innovative procedures and methods.

Teamwork and Problem Solving	Meeting Etiquette
Thinking Creatively	Preparation and Participation in Meetings
Taking Risks	Conducting Two-Person or Large Group Meetings
Building Team Communication	Inviting and Introducing Speakers
	Facilitating Discussions and Closing
	Preparing Visual Aids
	Virtual Meetings

1.3 Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

Problem Solving	Customer Service	The Application Process	Interviewing Skills	Finding the Right Job
Transferable Job Skills	Gaining Trust and Interacting with Customers	Providing Information, Accuracy and Double Checking	Preparing for an Interview	Locating Jobs and Networking
Becoming a Problem Solver	Learning and Giving Customers What They Want	Online Application Process	Questions to Ask in an Interview	Job Shopping Online
Identifying a Problem	Keeping Customers Coming Back	Following Up After Submitting an Application	Things to Include in a Career Portfolio	Job Search Websites
Becoming a Critical Thinker	Seeing the Customer's Point	Effective Résumés:	Traits Employers are Seeking	Participation in Job Fairs
Managing	Selling Yourself and the Company	Matching Your Talents to a Job	Considerations Before Taking a Job	Searching the Classified Ads
	Handling Customer Complaints	When a Résumé Should be Used		Using Employment Agencies
	Strategies for Customer Service			Landing an Internship
				Staying Motivated to Search

1.4 Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.

Workplace Ethics	Personal Characteristics	Employer Expectations	Business Etiquette	Communicating at Work
Demonstrating Good Work Ethic	Demonstrating a Good Attitude	Behaviors Employers Expect	Language and Behavior	Handling Anger
Behaving Appropriately	Gaining and Showing Respect	Objectionable Behaviors	Keeping Information Confidential	Dealing with Difficult Coworkers
Maintaining Honesty	Demonstrating Responsibility	Establishing Credibility	Avoiding Gossip	Dealing with a Difficult Boss
Playing Fair	Showing Dependability	Demonstrating Your Skills	Appropriate Work Email	Dealing with Difficult Customers
Using Ethical Language	Being Courteous	Building Work Relationships	Cell Phone Etiquette	Dealing with Conflict
Showing Responsibility	Gaining Coworkers' Trust		Appropriate Work Texting	
Reducing Harassment	Persevering		Understanding Copyright	
Respecting Diversity	Handling Criticism		Social Networking	
Making Truthfulness a Habit	Showing Professionalism			
Leaving a Job Ethically				

1.5 Apply the appropriate skill sets to be productive in a changing, technological, diverse workplace to be able to work independently and apply team work skills.

Expected Work Traits	Teamwork	Time Management
Demonstrating Responsibility	Teamwork Skills	Managing Time
Dealing with Information Overload	Reasons Companies Use Teams	Putting First Things First
Transferable Job Skills	Decisions Teams Make	Juggling Many Priorities
Managing Change	Team Responsibilities	Overcoming Procrastination
Adopting a New Technology	Problems That Affect Teams	Organizing Workspace and Tasks
	Expressing Yourself on a Team	Staying Organized
	Giving and Receiving Constructive Criticism	Finding More Time
		Managing Projects
		Prioritizing Personal and Work Life

1.6 Present a professional image through appearance, behavior and language.

On-the-Job Etiquette	Person-to-Person Etiquette	Communication Etiquette	Presenting Yourself
Using Professional Manners	Meeting Business Acquaintances	Creating a Good Impression	Looking Professional
Introducing People	Meeting People for the First Time	Keeping Phone Calls Professional	Dressing for Success
Appropriate Dress	Showing Politeness	Proper Use of Work Email	Showing a Professional Attitude
Business Meal Functions		Proper Use of Cell Phone	Using Good Posture
Behavior at Work Parties		Proper Use in Texting	Presenting Yourself to Associates
Behavior at Conventions			Accepting Criticism

International Etiquette			Demonstrating Leadership
Cross-Cultural Etiquette			
Working in a Cubicle			

Support of CTAE Foundation Course Standards and Georgia Standards of Excellence L9-10RST 1-10 and L9-10WHST 1-10:
Georgia Standards of Excellence ELA/Literacy standards have been written specifically for technical subjects and have been adopted as part of the official standards for all CTAE courses.

Course Standard 2

IT-NSS-2
Identify the fundamental principles of networking demonstrating installation, configuration, optimization, and upgrades of networking.

2.1 Identify tools used in network installation and configuration.
2.2 Use diagnostic procedures and troubleshooting techniques in solving network problems perform preventive maintenance on networks.
2.3 Describe the different types of common network cables and connectors by defining each as relating to speed and connection technology for the purpose of establishing connectivity.
2.4 Install and configure network cards for wired and wireless connection.

Course Standard 3

IT-NSS-3
Explore local-area network (LAN), metropolitan area network (MAN), wide-area network (WAN), and wireless local-area network (WLAN) trends and issues including the basics of telecommunications and use in the interconnection of networks.

3.1 Explain the characteristics and differences between LAN, MAN, WAN, and WLAN.
3.2 Compare and contrast a peer-to-peer network with a client/server network.
3.3 Explain the common networking protocols.
3.4 Explain the how data is packaged and transmitted using protocols.
3.5 Explain the purpose of general network devices such as a hub, repeater, switch, and router.
3.6 Compare and Contrast the similarities and differences between each layer of the OSI Model and the TCP/IP Model when data is transmitted.

Course Standard 4

IT-NSS-4
Demonstrate knowledge of LAN physical media and knowledge of network connectivity basics.

4.1 List the characteristics of the IEEE 802.3 (Ethernet), 802.5 (token right), 802.3 (fiber-optic), and 802.11 (wireless) standards.
4.2 Analyze each standard and determine which would be used in certain business network environments.
4.3 Explain the difference between different network media – Copper Core, Fiber-Optic, and Wireless.
4.4 Describe the major differences between an analog and digital signal.
4.5 Explain Broadband, Baseband, and telecommunication services during data transmission.
4.6 Define simplex, half-duplex, and full-duplex communication.
4.7 Configure a wireless network card and record all configuration properties.

Course Standard 5

IT-NSS-5

Understand through explanation and demonstration of the two standard computer network communication protocols (OSI Layer and TCP/IP) and its importance to standards-based networks.

5.1 Compare and contrast the similarities and differences between each layer of the OSI model and the TCP/IP model when data is transmitted.
5.2 Explain difference between IPv4 and IPv6 network addresses.
5.3 Explain the network address translation process.
5.4 Explain public and private addressing.
5.5 Describe the characteristics of each protocol and its purpose in OSI Layer and the TCP/IP protocol stack.
5.6 Describe how UDP, TCP, and IP relate to the OSI model.
5.7 Interpret TCP/IP troubleshooting utilities.
5.8 Compare the IPX/SPX protocol suite to the OSI model.
5.9 Compare the Apple Talk protocol suite to the OSI model.

Course Standard 6

IT-NSS-6

Demonstrate the concept of sub-netting and the importance to standards-based networks.

6.1 Demonstrate how to access TCP/IP properties for all major operating systems.
6.2 Understand how to Identify the different class of networks of an IPv4 IP address.
6.3 Demonstrate conversion methods of binary, decimal, and hexadecimal.
6.4 Calculate VLSM (Various Length Subnet Masks) needed for network administration.
6.5 Explain the purpose, advantages and disadvantages of sub-netting and super-netting.
6.6 Understand the characteristics and purpose of a Virtual LAN (VLAN).

Course Standard 7

IT-NSS-7

Identify the fundamental principles of network security systems for optimal network operation and administration.

7.1 Identify common network ports used for security breaches and vulnerabilities.
7.2 Compare and contrast symmetrical and asymmetrical encryption.
7.3 Explain the importance of user authentication (passwords) and certificate authority.
7.4 Demonstrate security processes associated with Challenge Handshake Access Protocol (CHAP).
7.5 Describe how firewall and proxy servers are used to secure network access.
7.6 Explain various monitoring protocol tools to secure network traffic.
7.7 Understand router security issues.

Course Standard 8

IT-NSS-8

Troubleshoot network problems and functions.

8.1 Identify ways to research online and locate troubleshooting techniques.
8.2 Explain industry certified troubleshooting strategies (CompTia, Cisco, etc.).
8.3 Perform Network Address Translation configuration and troubleshooting.
8.4 Explain network documentation.
8.5 Describe how event logs are used to assist with troubleshooting network issues.
8.6 Explain troubleshooting methodologies and tools.
8.7 Perform network troubleshooting by layer.

Course Standard 9

IT-NSS-9

Create a network using design standards, analysis, and section for networks.

9.1 Describe the factors to be considered when designing or modifying a network.
9.2 Describe methods used for naming conventions.
9.3 Explain the various stages of network design.
9.4 Identify and explain terminology used by standards to identify network cable connection locations.
9.5 Describe the various facilities used in a telecommunications infrastructure.

Course Standard 10

IT-NSS-10

Explain computer network operation and management procedures including network maintenance and diagnostic testing.

10.1 Explain why and how a baseline is established.
10.2 Describe the commonly accepted practices for protecting data.
10.3 Describe the use of fault tolerance and different data backup strategies.
10.4 Explain proper procedures for installing patches, upgrades, and service packs.
10.5 List commonly accepted antivirus procedures and policies.

Course Standard 11

IT-NSS-11

Apply network applications and knowledge of network operating systems by installing basic system architectures using current windows operating system software and perform network administration.

11.1 Explain the Windows authentication process.
11.2 Explain the Active Directory authentication process.
11.3 Explain the ways to obtain interoperability between clients and servers in networks with different network operating systems.
11.4 Compare and contrast the different file systems (FAT16, FAT32, and NTSF).
11.5 Demonstrate knowledge of network applications and architecture protocols.

Course Standard 12

IT-NSS-12

Explore how related student organizations are integral parts of career and technology education courses through leadership development, school and community service projects, **entrepreneurship development, and competitive events.**

12.1 Explain the goals, mission, and objectives of Future Business Leaders of America.
12.2 Explore the impact and opportunities a student organization (FBLA) can develop to bring business and education together in a positive working relationship through innovative leadership and career development programs.
12.3 Explore the local, state, and national opportunities available to students through participation in related student organization (FBLA) including but not limited to conferences, competitions, community service, philanthropy, and other FBLA activities.
12.4 Explain how participation in career and technology education student organizations can promote lifelong responsibility for community service and professional development.
12.5 Explore the competitive events related to the content of this course and the required competencies, skills, and knowledge for each related event for individual, team, and chapter competitions.