Georgia CTAE

Networking Fundamentals (11.46100) (2021)

Adopted 2021

Demonstrate employability skills required by business and industry. IT-NF-1

1. **Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.** IT-NF-1.1
2. **Demonstrate creativity by asking challenging questions and applying innovative procedures and methods.** IT-NF-1.2
3. **Exhibit critical thinking and problem-solving skills to locate, analyze and apply information in career planning and employment situations.** IT-NF-1.3
4. **Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.** IT-NF-1.4
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.** IT-NF-1.5
6. **Present a professional image through appearance, behavior, and language.** IT-NF-1.6

Review and update personal online career portfolio. IT-NF-2

1. **Review and update résumé to reflect new knowledge and skills mastery and additional work experience.** IT-NF-2.1
2. **Compose an additional cover letter seeking employment for a position representative of new skills, knowledge, and work experience.** IT-NF-2.2
3. **Replace outdated transcripts to reflect current courses successfully completed.** IT-NF-2.3
4. **Review and revise existing artifacts to bring them up to date with new skills mastered, as necessary.** IT-NF-2.4
5. **Identify and upload additional industry-appropriate artifacts reflective of mastered skills throughout this course. Write and include a reflective entry for each artifact discussing steps taken, problems encountered and how they were overcome, and other pertinent information about the learning.** IT-NF-2.5

Identify the fundamental principles of networking, local area networks, network topologies and access methods, Ethernet architecture, and the client-server and peer-to-peer networking models. IT-NF-3	1. **Define a local area network (LAN), including LAN elements, design, perimeter networks, and IP addressing.** IT-NF-3.1 2. **Identify the different types of LANs.** IT-NF-3.2 3. **Identify what a perimeter network is and explain its purpose.** IT-NF-3.3 4. **Identify the different network topologies, such as star, mesh, and ring.** IT-NF-3.4 5. **Identify and explain different protocols, such as TCP, UDP, layers, HTML, FTP, websocket, and others.** IT-NF-3.5 6. **Define Ethernet standards.** IT-NF-3.6 7. **Identify the differences between client/server and peer-to-peer distributed networks.** IT-NF-3.7
Identify the layers of the OSI (Open Systems Interconnection) Model and define thecommunications sub-network. IT-NF-4	1. **Explain the OSI model by defining each of the layers.** IT-NF-4.1 2. **Explain the separate the functions of the lower levels of the OSI, or the communications sub-network, from the upper levels where message creation begins.** IT-NF-4.2 3. **Explain the differences between layer 2 and layer 3 switches, and to gain a basic understanding of how they operate.** IT-NF-4.3 4. **Differentiate between the OSI model and the TCP model.** IT-NF-4.4
Identify wired networks, media types and wireless networks. IT-NF-5	1. **Identify twisted-pair cable, cabling tools, and testers.** IT-NF-5.1 2. **Identify what can interfere with twisted-pair cabling and how to avoid it.** IT-NF-5.2 3. **Identify some of the basics about fiber optic cabling and some of the standards associated with fiber optic cabling.** IT-NF-5.3 4. **Identify wireless devices, wireless settings and configurations, wireless standards, and encryption protocols.** IT-NF-5.4
Explore Internet Protocol IPv4 and IPv6 and emerging protocols in industry. IT-NF-6	1. **Demonstrate how to categorize IPv4 addresses using classifications such as Class A, B, and C.** IT-NF-6.1 2. **Identify the default gateway and DNS server and how to configure them within a network adapter's TCP/IP properties dialog box.** IT-NF-6.2 3. **Demonstrate how to define advanced TCP/IP concepts, such as NAT and sub-netting, and how to create a sub-netted network.** IT-NF-6.3 4. **Demonstrate how to define CIDR.** IT-NF-6.4

	5. Demonstrate the basics of IPv6 and how to configure IPv6 in the command line. IT-NF-6.5
	6. Define IPv6 dual stack and tunneling technologies. IT-NF-6.6
Demonstrate how to work with the basic and advanced command prompts. IT-NF-7	1. Work with the command prompt as an administrator and in an efficient manner. IT-NF-7.1
	2. Demonstrate basic TCP/IP commands such as ipconfig and ping to analyze and test a network. IT-NF-7.2
	3. Demonstrate more advanced commands such as netstat, nbtstat, tracert, pathping, route, and netsh to fully examine a computer and configure it in the command line. IT-NF-7.3
	4. Work with the Net command in an effort to find out more information about a system, start and stop services, and work with the network configuration. IT-NF-7.4
Demonstrate how to set up common networking services and define Name Resolution Techniques. IT-NF-8	1. Install and configure DHCP to hand out IP addresses to client computers. IT-NF-8.1
	2. Explain the four-step DHCP process known as DORA. IT-NF-8.2
	3. Install and configure Terminal Services so that client computers can connect remotely to a server and take control of it in the GUI. IT-NF-8.3
	4. Install and configure Network Policy Service (NPS) as a LAN router. IT-NF-8.4
	5. Define IPsec and the various types, including SA, AH, and ESP. IT-NF-8.5
	6. Explain how DNS and WINS function and how to install them in Windows Server 2008, as well as how to create forward lookup zones. IT-NF-8.6
Explore the concepts of Wide Area Networks, describe routing, and define common WAN technologies and connections. IT-NF-9	1. Explain the differences between static and dynamic routing. IT-NF-9.1
	2. Describe how to install and configure RRAS to function as a network router and how to install the Routing Information Protocol. IT-NF-9.2
	3. Explain the basics about various wide area networking technologies. IT-NF-9.3
	4. Explain the basics of software-defined networking. IT-NF-9.4
	5. Explain different personal and small business Internet connectivity types. IT-NF-9.5
Explore network infrastructures and	1. Differentiate between the Internet, intranets, and extranets. IT-NF-10.1

network security. IT-NF-10	2. **Demonstrate how to set up a virtual private network.** IT-NF-10.2 3. **Explain firewalls and how to initiate port scans on them to see whether they are locked down.** IT-NF-10.3 4. **Explain other perimeter devices and zones, such as proxy servers, internet content filters, NIDS, NIPS, and the DMZ.** IT-NF-10.4
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. IT-NF-11	1. **Explain the goals, mission, and objectives of Future Business Leaders of America (FBLA) and/or Technology Student Association (TSA) and/or SkillsUSA.** IT-NF-11.1 2. **Explore the impact and opportunities a student organization (FBLA, TSA, SkillsUSA) can develop to bring business and education together in a positive working relationship through innovative leadership and career development programs.** IT-NF-11.2 3. **Explore the local, state, and national opportunities available to students through participation in related student organizations (FBLA, TSA, SkillsUSA) including but not limited to conferences, competitions, community service, philanthropy, and other student organization activities.** IT-NF-11.3 4. **Explain how participation in career and technology education student organizations can promote lifelong responsibility for community service and professional development.** IT-NF-11.4 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.** IT-NF-11.5