

This document is intended to help teachers evaluate the CyberStart America learning platform for classroom use in Introduction to Digital Technology, Introduction to Cybersecurity, and/or Advanced Cybersecurity courses. The matrices show connections between the *Georgia Standards of Excellence* and the CyberStart game’s three “bases”.

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This document was developed as part of an inter-institutional collaboration among the University of North Georgia, Georgia Tech Research Institute, and the Georgia Cyber Center.

This document is not endorsed by the SANS Institute, makers of the CyberStart America platform, or the Georgia Department of Education.

If you need this document in an alternate format for accessibility purposes (e.g. Braille, large print, audio, etc.), please contact us at cyberstartgeorgia@ung.edu.

Introduction to Software Technology

GSE	HQ Base	Moon Base	Forensics Base
IT-IHT-2 Establish a personal online career portfolio and begin uploading relevant artifacts.	X	X	X
2.1 – Compare a variety of secure online repositories and select the best one for specific career goals, such as Github for education, Dropbox, Jimdo, Uxfol.io, Portfoliobox, and many others.			
2.2 – Establish an account for long-term use to upload professional artifacts over the course of the career pathway.			
2.3 – Upload a professional, true, and accurate resume and cover letter seeking employment for a position representative of current skills and knowledge.			
2.4 – Upload additional standard job search items, such as digital badges and certificates earned for industry-recognized credentials.	X	X	X
2.5 – Identify and upload 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.			
2.6 – Organize the portfolio in a manner that makes documents and artifacts easy to locate and access for review.			
IT-IST-3 Explore, research, and present findings on positions and career paths in technology and the impact of technology on chosen career area.			
3.1 Develop technical reading and writing skills to follow instructions.	X	X	X
3.2 Use collaborative tools to communicate with team members, such as online meeting platforms, group messaging, and shared online documents and files.			
3.3 Research specific IT careers, including post-secondary continuing education options, IT credentials, required job skills, potential salaries in Georgia, and work environment. Upload to online career portfolio.	X	X	X
IT-IST-4 Demonstrate effective professional communication skills (oral, written, and digital) and practices that enable positive relationships with all audiences of a business.			
4.1 Differentiate between the different audiences of a business, including users, clients, customers, contractors, vendors, and others.			
4.2 Explain the impact of emerging technologies on a business and how it affects the bottom line.			
4.3 Apply strategies for identifying routine software problems current to everyday life. a. Compose an appropriate report outlining procedures to correct an identified software problem. Upload to online career portfolio.			

4.4	Demonstrate ability to assist all audiences in a professional manner. a. Actively listen to your audience to determine individual needs, such as specifications for a design, breaking down the specifications, and communicating to non-technical individuals. b. Ensure that your assistance promotes the best interests of the company.		
4.5	Identify effective database strategies and create a database to maintain a customer list. Upload to online career portfolio.		
4.6	Create a communication document utilizing advanced word processing, spreadsheet, presentation, electronic mail, and database script and app tools for business.		
IT-IST-5 Identify, describe, evaluate, and use appropriate technology for given situations.		X	X
5.1	Demonstrate understanding of set up of a basic computer workstation.		
5.2	Identify input and output devices and ports, including keyboards, monitors, printers, touch screens, mice, peripheral connectors (e.g., USB, Lightning, HDMI, and emerging technologies), microcontrollers and sensors (e.g., GPS, temperature, accelerometer).		
5.3	Describe and explore current and emerging software, including operating systems, application software, and applications for software development.	X	X
5.4	Explain the function and purpose of software tools, text editors, Integrated Development Environments (IDEs), and software development toolchains.	X	X
IT-IST-6 Understand, communicate, and adapt to a digital world.		X	X
6.1	Develop a working IT vocabulary specific to software and programming.	X	X
6.2	Describe trends in emerging, evolving, and future computer technologies and their influence on IT practices, such as mobile technology, cloud computing, and microcontrollers.	X	X
6.3	Recognize online risks and dangers in order to take appropriate actions to protect the business and self while using digital tools and resources.	X	X
6.4	Define and demonstrate folder and file management and the importance of content-management systems.	X	X
6.5	Identify and explain how to protect Personally Identifiable Information (PII) in a digital world (Refer to FERPA guidelines).		
IT-IST-7 Use computational thinking procedures to analyze and solve problems.			
7.1	Explain the software development process to solve problems.		
7.1	Explain the differences between various software development models such as the		

	iterative and incremental model, scrum, and waterfall.			
7.2	Explore commonly used documentation tools for design specifications, such as flowcharts, pseudocode, visual and textual storyboards.			
7.3	Create a table showing the most prevalent programming languages currently being used and determine industry tasks where each would be best utilized. Upload to online career portfolio.			
IT-IST-8 Create and organize webpages through the use of a variety of web programming design tools.				
8.1	Understand and apply design principles to create professional appearing and functioning web pages.	X		
8.2	Understand elements of web design, including HTML5, CSS3, responsive design, site usability and accessibility, relation of site to business, and story the site reveals about the business.	X		
8.3	Describe how HTML5 and CSS3 are living web standards.	X		
8.4	Understand the Document Object Model (DOM) used in web page organization and in the creation of dynamic web pages.			
8.5	Design simple and dynamic webpages incorporating HTML5 elements (e.g., text, audio, video, and canvas elements such as SVG and other graphics), navigation, linking, forms and client-side scripting. Upload to online career portfolio.			
IT-IST-9 Identify and explain the building blocks, principles, and ways to access code within programming languages used today.			X	X
9.1	Explain and apply the procedures used in current programming languages to access code libraries, scripts, and related coding principles.		X	X
9.2	Describe a variety of programming languages used to solve problems.			
9.3	Explain how sequence, selection, and iteration are building blocks of algorithms.		X	X
9.4	Explain how procedural abstraction is implemented to reuse code.		X	X
9.5	Demonstrate the principles of readability and self-documenting code. a. Use an appropriate naming convention in the creation of variables, functions and/or procedures.		X	X
9.6	Use comments to assist others in understanding programs, algorithms, and functions and/or procedures.		X	X
IT-IST-10 Design, develop, test, and implement programs using high-level programming languages.				
10.1	Use various debugging and testing methods to ensure program correctness.			

10.2	Explore text-editors and Integrated Development Environments (IDEs) in the use of software development for different software and hardware platforms.			
10.3	Demonstrate the use of pair-programming in the development of new programs and applications.			
10.4	Demonstrate the use of content-management systems to track changes and allow for multiple people to create, edit and modify source code files.			
10.5	Create and access libraries and Application Programming Interfaces (APIs) in the development of programs or applications. Upload to online career portfolio.			
10.6	Understand how data from an external source such as a file, database, or stream can be input, manipulated, and output in programs.		X	X
IT-IST-11 Describe, analyze, develop, and follow policies for managing ethical and legal issues in the business world and in a technology-based society.				
11.1	Demonstrate positive cyber citizenry by applying industry-accepted ethical practices and behaviors.	X	X	X
11.2	Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.	X	X	X
11.3	Exercise digital citizenship as a lifelong learner.	X	X	X
11.4	Debate laws and regulations that impact the development and use of software.	X	X	X
11.5	Describe the various copyright licenses used in the creation and distribution of software.			
11.6	Describe personal and legal consequences of inappropriate use of resources and online content, including but not limited to plagiarism, piracy, illegal downloading, copyright infringement, licensing infringement, and inappropriate use of software, hardware, and mobile devices.	X	X	X

Introduction to Hardware Technology

GSE	HQ Base	Moon Base	Forensics Base
IT-IHT-2 Establish a personal online career portfolio and begin uploading relevant artifacts.	X	X	X
2.1 Compare a variety of secure online repositories and select the best one for specific career goals, such as Github for education, Dropbox, Jimdo, Uxfol.io, Portfoliobox, and many others.			
2.2 Establish an account for long-term use to upload professional artifacts over the course of the career pathway.			
2.3 Upload a professional, true, and accurate resume and cover letter seeking employment for a position representative of current skills and knowledge.			
2.4 Upload additional standard job search items, such as digital badges and certificates earned for industry-recognized credentials.	X	X	X
2.5 Identify and upload 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.			
2.6 Organize the portfolio in a manner that makes documents and artifacts easy to locate and access for review.			
IT-IHT-3 Explore, research, and present findings on positions and career paths in technology and the impact of technology on chosen career area.	X	X	X
3.1 Develop technical reading and writing skills to follow instructions.	X	X	X
3.2 Work in a team to solve problems and share knowledge.			
3.3 Explore the impact of emerging technologies on careers, including non-traditional technology fields and careers in each of the Georgia Career Clusters.			
3.4 Use collaborative tools to communicate with team members, such as online meeting platforms, group messaging, and shared online documents and files.			
3.5 Research specific IT careers, including post-secondary continuing education options, IT credentials, required job skills, potential salaries in Georgia, and work environment. Upload to online career portfolio.	X	X	X
3.6 Explore careers in IT focused on customer relationships.			
IT-IHT-4 Demonstrate effective professional communication skills (oral, written, and digital) and practices that enable positive relationships with all audiences of a business.			
4.1 Differentiate between the different audiences of a business, including users, clients, customers, contractors, vendors, and others.			

4.2 Recognize the importance of each audience to a business. a. Identify organizations' products and services. b. Explain the impact of Information Technology (IT) to a business and how it affects the bottom line. c. Communicate how technology can be used to create solutions to business challenges and present to stakeholders in professional business format. d. Demonstrate an ability to provide "value-add" partnership between IT and business.			
4.3 Demonstrate ability to assist all audiences in a professional manner. a. Actively listen to your audience. b. Determine the individual needs of the audience. c. Project a professional business image (e.g., appearance, voice, grammar, word usage, enunciation, nonverbal communication). d. Interact with customers and colleagues in a professional manner (e.g., prompt, friendly, courteous, respectful, helpful, knowledgeable, and understandable). e. Determine the best method to maintain a customer list and communication platform			
4.4 Determine the best method to maintain a customer list and communication platform.			
4.5 Demonstrate understanding of word processing, spreadsheet, presentation, and database software as a communication tool for business.			
4.6 Develop a working IT vocabulary.	X	X	X
IT-IHT-5 Identify, evaluate, select, and use appropriate technology.	X	X	X
5.1 Identify hardware device functions, including peripheral devices, input devices, and portable hardware appropriate for specific tasks and emerging hardware as it impacts the workplace and society.	X	X	X
5.2 Demonstrate understanding of how to set up a basic computer workstation, including various computer types, internal components, connectors, monitors, keyboards, mice, printers, computer voltage, and power requirements.			
5.3 Describe trends in emerging, evolving, and future computer technologies and their influence on IT practices, such as mobile technology, computing tablets, and cloud computing.	X	X	X
5.4 Recognize online risks and dangers in order to take appropriate actions to protect the business and self while using digital tools and resources.	X	X	X
5.5 Demonstrate ability to access, navigate and use online resources and technologies.	X	X	X

5.6 Define and demonstrate folder and file management and the importance of data back-up procedures.	X	X	X
5.7 Explore hardware devices outside of the traditional PC/laptop scenario such as wearables, IoT devices, smart devices, and the role that these devices are filling in the connected world.			
IT-IHT-6 Explore and explain the basics of Customer Relationship Management (CRM).			
6.1 Describe trends in emerging, evolving, and future CRM Systems and their influence on IT practices.			
6.2 Define and demonstrate the basics and importance of asset management.			
6.3 Understand the different roles of the IT Helpdesk and the requirements of each.			
6.4 Demonstrate satisfactory customer service skills in a CRM-based environment.			
IT-IHT-7 Explore and explain the basic components of computer networks.	X	X	X
7.1 Demonstrate understanding of the OSI model and how it relates to network communications.	X	X	X
7.2 Describe common network features, such as routing, switching, network security devices, basic topologies, and networking standards.	X	X	X
7.3 Illustrate and describe the functions of various types of networks, including wireless.			
7.4 Explain key issues in data transmission.	X	X	X
7.5 Identify factors which affect the range and speed of wireless service.			
7.6 Explore networking trends and issues affecting business and personal use.			
IT-IHT-8 Use computational thinking procedures to analyze, troubleshoot, and solve problems.			
8.1 Apply strategies for identifying routine hardware and software problems current to everyday life.			
8.2 Identify compatibility issues and describe operational problems caused by hardware errors.			
8.3 Explain how technology can be used to solve problems.	X	X	X

8.4 Explore commonly used documentation tools for design specifications, such as flowcharts and visual and textual storyboards.			
8.5 Define and demonstrate understanding of Knowledge-Based articles (KB) and the impact of research-based troubleshooting.			
8.6 Demonstrate an understanding of Computational Problem Solving as a part of Computational Thinking.			
IT-IHT-9 Describe, analyze, develop, and follow policies for managing ethical and legal issues in the business world and in a technology-based society.			
9.1 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.	X	X	X
9.2 Recognize the ethical and legal issues while accessing, creating, and using digital tools and resources in order to make informed decisions.	X	X	X
9.2 Exercise digital citizenship as a lifelong learner. a. Promote and model digital etiquette and responsible social technology interactions, permanence of digital footprints, online image and presence, etc.	X	X	X
9.4 Understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.	X	X	X
9.5 Demonstrate an understanding of technology-related problems such as Internet addiction, mobile phone addiction, and always-connected devices.			
9.6 Describe personal and legal consequences of inappropriate use of resources and online content. a. Plagiarism, piracy, illegal downloading, copy-right infringement, licensing infringement, inappropriate use of software, hardware, and mobile devices.	X	X	X
9.7 Identify security issues and trends affecting computers and information privacy. a. Virus, open or free networks, user control methods, file sharing, etc.	X	X	X
9.8 Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.	X	X	X
9.9 Identify criminal activity in relationship to cybercrime, the Internet, and Internet trafficking. a. Common internet crimes, techniques to identify criminal activity and prevention actions related to cybercrime.	X	X	X

9.10 Understand newly emerging technologies like AI and Deepfakes and their impact on ethical and legal issues in business.			
9.11 Understand and apply ethical behavior when working with intellectual property.	X	X	X
9.12 Understand fundamental ethical frameworks such as IT Compliance and laws and precedents from industry affect how IT operates. Differentiate between national, state, local, and industry ethical standards and how they affect the role of IT in an organization.			
IT-IHT-10 Use tools, diagnostic procedures and troubleshooting techniques for personal computer components.			
10.1 Recognize and apply the basic aspects of troubleshooting theory, such as power and cable connections, compatibility, and other basic issues.			
10.2 Recognize the names, purposes, characteristics, and appropriate application of tools used in computer repair.			
10.3 Identify and apply basic diagnostic procedures and troubleshooting techniques.			

Introduction to Cybersecurity

Georgia Standards of Excellence	HQ Base	Moon Base	Forensics Base
IT-ICS-2 Demonstrate an understanding of cybersecurity concepts and research.	X	X	X
2.1 Explain the importance of data security.	X	X	X
2.2 Explain the concepts of confidentiality, integrity, availability, authentication, and non-repudiation. [NICE 63]	C	X	X
2.3 Research current events on breaches; focus on particular Information Assurance (IA) areas that were compromised. [NICE 165]			
2.4 Explain the importance of physical security.	X		
IT-ICS-3 Identify the fundamental principles of networking (wired and wireless), local area networks (elements, perimeter networks, IP addressing, access methods and topologies), client-server and peer-to-peer networking models, and wide area networks.			
3.1 Define and identify the different types of LANs.			
3.2 Identify and describe the purpose for a perimeter network.			
3.3 Identify the different network topologies to include client/server and peer-to-peer distributed networks.			
3.4 Define and describe Ethernet standards.			
3.5 Identify twisted-pair cable, cabling tools, cabling testers and describe what can interfere with twisted-pair cabling, and how to avoid it.			
3.6 Identify wireless devices, wireless settings and configurations, wireless standards, and encryption protocols.	X	X	X
3.7 Explain the differences between static and dynamic routing.			
3.8 Explain how to install and configure Routing and Remote Access Service (RRAS) to function as a network router and how to install the Routing Information Protocol.			
3.9 Explain the basics about various other wide area networking technologies.			
3.10 Explain different personal and small business Internet connectivity types.			
IT-ICS-4 Identify the fundamental principles of the Open Systems Interconnection Model, Internet Protocol IPv4 and IPv6, and common networking services to include Name Resolution Techniques.		X	X

4.1 Explain the Open Systems Interconnection (OSI) model by defining each of the layers and their functions.			
4.2 Explain the differences and operation of layer 2 and layer 3 switches.			
4.3 Differentiate between the OSI model and the TCP model.			X
4.4 Demonstrate how to categorize IPv4 addresses using the Class A, B, and C classifications.			
4.5 Identify the default gateway and Domain Name System (DNS) server and explain how to configure within a network adapter's Transmission Control Protocol/Internet how to configure within a network Protocol (TCP/IP) properties dialog box. adapter's Transmission Control Protocol/Internet			X
4.6 Demonstrate how to define advanced TCP/IP concepts, such as Network Address Translation (NAT) sand sub-nets, and how to create a sub-netted network.			
4.7 Demonstrate the basics of IPv6 and how to configure IPv6 in the command line and define dual stack and tunneling technologies.			
4.8 Implement Dynamic Host Configuration Protocol (DHCP) to assign IP addresses to client computers demonstrating an understanding of the four-step process known as DORA (discover, offer, request, acknowledgment).			
4.9 Implement Terminal Services so that client computers can connect remotely to a server and take control of it in the Graphical User Interface (GUI).		X	
4.10 Implement Network Policy Service (NPS) as a LAN router and define IPsec and the various types of protocols, including Security Associations (SA), Authentication Header (AH), and Encapsulating Security Payload (ESP).			
4.11 Explain the function of Domain Name System (DNS) and Windows Internet Name Service (WINS) and explain how to install in Windows Server 2008, as well as how to create forward-lookup zones.			X
IT-ICS-5 Demonstrate how to work with the basic and advanced command prompts.	X	X	
5.1 Manipulate and explain the command prompt as an administrator.	X		
5.2 Demonstrate basic TCP/IP commands such as ipconfig and ping to analyze and test a network.			
5.3 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.			
5.4 Manipulate 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-ICS-6 Explore and research network infrastructures and network security.		X	
6.1 Differentiate between the Internet, Intranets, and Extranets.			

6.2 Demonstrate how to set up a virtual private network (VPN).		X	
6.3 Explain firewalls and how to initiate port scans on them to see whether they are locked down.		X	
6.4 Explain other perimeter devices and zones, such as proxy servers, internet content filters, Network Intrusion Detection Systems (NIDS), Network Intrusion Prevention Systems (NIPS), and Demilitarized Zones (DMZ).			
IT-ICS-7 Demonstrate how to work with fundamental components of cybersecurity.		X	
7.1 Explain the security function and purpose of network devices and technologies (e.g., Intrusion Detection System (IDS) tools and applications and IDS hardware and software, including open-source tools, and their capabilities. [NICE 3, 59 and 146].		X	
7.2 Distinguish and differentiate between network design elements and compounds.		X	
7.3 Securely install cabling.			
7.4 Configure firewalls.		X	
7.5 Configure secure network connections (in Windows or Linux).		X	
7.6 Justify the use of basic Windows or Linux commands to configure communications (e.g. ipconfig/ifconfig).		X	
7.7 Design a basic secure network topology demonstrating knowledge of intrusion detection methodologies and techniques for detecting host- and network-based intrusions via intrusion detection technologies. [NICE 66]		X	
IT-ICS-8 Demonstrate how to employ host system and application security.		X	X
8.1 Compare and contrast common operating systems, e.g., Windows, Linux, OS X.		X	X
8.2 Compare and contrast common file systems.			
8.3 Explain the importance of application security.			X
8.4 Demonstrate knowledge of system and application security threats and vulnerabilities (e.g., buffer overflow, mobile code, cross-site scripting, Procedural Language/Structured Query Language [PL/SQL] and injections, race conditions, covert channel, replay, return-oriented attacks, malicious code). [NICE 105]		X	X
8.5 Install and configure anti-virus software.			
8.6 Perform command line exercises specific to operating systems.		X	
8.7 Demonstrate knowledge of what constitutes a network attack and the relationship to both threats and attacks. [NICE 150] vulnerabilities and how to differentiate between types of application		X	
8.8 Justify the need and implement Active X and Java Security.			

8.9 Discuss protection from buffer overflow attacks.			
8.10 Prevent input validation attacks and scripting attacks.			
8.11 Justify the need for and implement secure cookies.			X
IT-ICS-9 Demonstrate how to implement proper security administration.		X	X
9.1 Implement appropriate procedures to establish host security.			
9.2 Secure operating systems (OS), user profiles, and computer permissions.			
9.3 Secure firewalls and Web browsers.			
9.4 Establish a secure baseline for host OS.			
9.5 Install and manage MS Windows.			
9.6 Analyze security using Microsoft Baseline Security Analyzer (MBSA).			
9.7 Demonstrate knowledge of data backup, types of backups (e.g., full, incremental, and recovery concepts and tools such as Microsoft (MS) Backup/Restore. [NICE 29]			X
9.8 Methodically examine and conduct a security audit to review system performance and settings in Windows and Linux			
9.9 Demonstrate the ability to select and set both file and folder permissions in Windows and Linux		X	X
9.10 Set up shared documents and folders.			
9.11 View and edit Windows services (disable services).			X
9.12 Enable Extended File System (EFS).			
9.13 View and change the backup archive bit in order to change the back-up file status.			
9.14 Secure DNS/BIND, web, email, messaging, FTP servers.			X
9.15 Secure directory services, Dynamic Host Configuration Protocol (DHCP), file, and print servers.			
IT-ICS-10 Demonstrate how to implement proper access controls and identity management.	X		X
10.1 Demonstrate knowledge of host/network access controls (e.g., access control list) to include the function and purpose of authentication services. [NICE 49]			
10.2 Explain the fundamental concepts and best practices related to authentication, authorization, and access control.			

IT-ICS-11 Research and explore basic principles of cryptology.	X	X	X
11.1 Summarize general cryptography concepts (symmetric encryption, asymmetric encryption). [NICE 27]	X	X	X
11.2 Demonstrate basic cipher systems (e.g., Caesar cipher, Vigenere cipher).	X	X	X
11.3 Demonstrate file hashing.	X	X	X
11.4 Demonstrate knowledge of current applications of steganography to include concealed identification, authentication, and communications.	X	X	X

Advanced Cybersecurity

Georgia Standards of Excellence	HQ Base	Moon Base	Forensics Base
IT-ACS-2 Explore concepts of cybersecurity related to legal and ethical decisions. The following elements should be integrated throughout the content of this course.	X	X	X
2.1 Describe the threats to a computer network, methods of avoiding attacks, and options in dealing with virus attacks.	X	X	X
2.2 Investigate potential abuse and unethical uses of computers and networks.	X	X	X
2.3 Explain the consequences of illegal, social, and unethical uses of information technologies (e.g., piracy; illegal downloading; licensing infringement; inappropriate uses of software, hardware, and mobile devices).	X	X	X
2.4 Differentiate between freeware, shareware, and public domain software copyrights.			
2.5 Discuss computer crimes, terms of use, and legal issues such as copyright laws, fair use laws, and ethics pertaining to scanned and downloaded clip art images, photographs, documents, video, recorded sounds and music, trademarks, and other elements for use in Web publications.			
2.6 Identify netiquette including the use of e-mail, social networking, blogs, texting, and chatting.			
2.7 Explain proper netiquette, including the use of e-mail, social networking, blogs, texting, and chatting.			
2.8 Discuss the importance of cyber safety and the impact of cyber bullying.			
IT-ACS-3 Investigate concepts of malware threats.	X	X	X
3.1 Analyze and differentiate among types of malware.		X	X
3.2 Identify malware code, including strings.		X	X
3.3 Demonstrate skill in handling malware. [NICE 153]		X	X
3.4 Demonstrate skill in preserving evidence integrity according to standard operating procedures or national standards. [NICE 217].		X	X
IT-ACS-4 Demonstrate how to analyze and react to various threats and vulnerabilities.	X	X	X
4.1 Analyze and differentiate among types of network attacks (e.g., virus, worms, trojans, unpatched software, password cracking, advanced persistent threats, etc.).	X	X	X

4.2 Distinguish between different social engineering attacks (e.g., baiting, phishing/spear phishing, pretexting/blagging, tailgating, quid pro quo, etc.).	X		
4.3 Distinguish between reconnaissance/footprinting, infiltration, network breach, network exploitation, and attack for effects (e.g., deceive, disrupt, degrade, and destroy).			X
4.4 Demonstrate an understanding of DoS/DDoS, session hijacking, HTTP spoofing, DNS attacks, switch attacks, man-in-the-middle (MITM) attacks, and cross site scripting, and drive-by-attacks.			X
IT-ACS-5 Apply advanced principles of cryptology.	X	X	X
5.1 Use and apply appropriate cryptographic tools and products.	X	X	X
5.2 Explain the core concepts of Public Key Infrastructure.	X		
5.3 Demonstrate knowledge of network access, identity, and access management (e.g., public key infrastructure [PKI]) and implement PKI, certificate management, and associated components. [NICE 79].	X	X	X
5.4 Install and configure Pretty Good Privacy (PGP) and send/receive PGP encrypted email.			
5.5 Install and view a digital certificate.	X		
5.6 Understand and master process to enroll for digital certificates.			
5.7 Renew, revoke, backup, and restore public and private key certificates.			
5.8 Install and secure a Certificate Authority (CA).			
5.9 Backup and restore a Certificate Authority (CA).			
IT-ACS-6 Apply advanced communications and wireless security techniques.		X	
6.1 Implement wireless networks in a secure manner.		X	
6.2 Analyze and differentiate among types of wireless attacks.		X	
6.3 Configure a wireless Access Point (WPA, WPA-2).			
6.4 Demonstrate use of InSSIDer and Netstumbler on wireless communications.			
6.5 Change the power level of a Wireless Local Area Network (WLAN) Access Point.			

6.6 Demonstrate knowledge of Virtual Private Network (VPN) security and configure Virtual Private Network (VPN). [NICE 148]			
6.7 Demonstrate knowledge of remote access policy Layer 2 Tunneling Protocol (L2TP) and Point-to-Point Tunneling Protocol (PPTP).			
IT-ACS-7 Implement organizational security techniques.	X	X	X
7.1 Explain the impact and proper use of environmental controls.		X	X
7.2 Explain the importance of security-related awareness and training.	X	X	X
7.3 Install environmental controls through Basic Input/Output System (BIOS).			X
7.4 Write organizational security policies (email, wireless, etc.).			
IT-ACS-8 Implement contingency planning (incident response and disaster recovery) techniques.		X	X
8.1 Demonstrate knowledge of incident response and handling methodologies. [NICE 61]		X	X
8.2 Demonstrate knowledge of incident categories, incident responses, and timelines for responses and compare and contrast aspects of business continuity. [NICE 60]		X	X
8.3 Execute disaster recovery plans and procedures.			X
8.4 Demonstrate the ability to capture volatile memory contents.			
8.5 Perform imaging functions, such as operating system, network, and software configurations.		X	X
8.6 Restore a machine from a known good backup.			X
IT-ACS-9 Perform security analysis, as well as testing and evaluation.		X	X
9.1 Analyze and differentiate among types of mitigation and deterrent techniques.		X	X
9.2 Implement assessment tools and techniques to discover security threats and vulnerabilities.		X	X
9.3 Explain the proper use of penetration testing versus vulnerability scanning in the context of vulnerability assessments.		X	X

9.4 Demonstrate skill in conducting vulnerability scans and recognizing vulnerabilities in security systems (e.g., Nessus, Nmap, Retina). [NICE 3]			X
9.5 Conduct a security audit.			
9.6 View and modify an Address Resolution Protocol (ARP) table.			
9.7 Evaluate the patch status of a machine.			
9.8 Demonstrate knowledge of packet-level analysis in order to install and view packet sniffer. [NICE 93]		X	X
9.9 Perform secure data destruction (e.g., Secure Erase, BCWipe).		X	X
IT-ACS-10 Implement risk management techniques for personal computer and network systems.	X	X	X
10.1 Explain risk-related concepts.	X	X	X
10.2 Perform a risk assessment.		X	
10.3 Identify mitigations for risks from risk assessment.		X	X
10.4 Conduct appropriate risk mitigation strategies.		X	X
IT-ACS-11 Demonstrate how to work with advanced methods of cybersecurity.	X	X	X
11.1 Apply and implement secure network administration principles.			X
11.2 Demonstrate knowledge of how network services and protocols interact to provide network communications in order to securely implement and use common protocols. [NICE 50]			X
11.3 Identify commonly used default network ports.		X	
11.4 Set up a Network Address Translation (NAT) device.			
11.5 Spoof a Media Access Control (MAC) address.			
11.6 Configure Virtual Private Network (VPN).			
11.7 Configure a remote access policy Layer 2 Tunneling Protocol (L2TP) and Point-to-Point Tunneling Protocol (PPTP).			

11.8 Demonstrate knowledge of network protocols (e.g., Transmission Control Protocol and Internet Protocol (TCP/IP), Dynamic Host Configuration Protocol (DHCP) and directory services (e.g., Domain Name System (DNS) by setting up common protocols, e.g., Secure Shell (SSH), netstat, Simple Mail Transfer Protocol (SMTP), nslookup, Telnet, DNS/Bind, FTP, IIS/Web Pages, DHCP/DNS server. [NICE 81]	X	X	X
11.9 Locate open ports by completing a port scan.		X	X
11.10 Demonstrate the knowledge and use of network statistics (netstat), a command purpose.		X	