



2022 Information Technology

Program CIP: 11.0101—Computer and Information Sciences, General

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The Research and Curriculum Unit (RCU), located in Starkville, as part of Mississippi State University (MSU), was established to foster educational enhancements and innovations. In keeping with the land-grant mission of MSU, the RCU is dedicated to improving the quality of life for Mississippians. The RCU enhances intellectual and professional development of Mississippi students and educators while applying knowledge and educational research to the lives of the people of the state. The RCU works within the contexts of curriculum development and revision, research, assessment, professional development, and industrial training.

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Standards

Standards and alignment crosswalks are referenced in the appendix. Depending on the curriculum, these crosswalks should identify alignment to the standards mentioned below, as well as possible related academic topics as required in the Subject Area Testing Program in Algebra I, Biology I, English II, and U.S. History from 1877, which could be integrated into the content of the units. Mississippi's CTE IT is aligned to the following standards:

National Business Education Association—Information Technology Standards

The National Business Education Association (NBEA) is the nation's leading professional organization, which recognizes that business education is essential for every student in today's rapidly changing society. Therefore, the NBEA strives to serve individuals and organizations involved in the instruction, administration, and deliverance of business education, standards, and materials. The NBEA recognizes that all students will take part in the economic system, encounter a diverse business environment, and use technology to manage information in some fashion during their lifetime. Thus, a curriculum focused on enabling students to become responsible citizens, capable of making wise economic decisions, will positively impact their personal and professional lives. *NBEA Business Education Library* (2020).

nbea.org

International Society for Technology in Education Standards (ISTE)

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iste.org

College- and Career-Readiness Standards

College- and career-readiness standards emphasize critical thinking, teamwork, and problem-solving skills. Students will learn the skills and abilities demanded by the workforce of today and the future. Mississippi adopted Mississippi College- and Career-Readiness Standards (MCCRS) to provide a consistent, clear understanding of what students are expected to learn and so teachers and parents know what they need to do to help them.

mdek12.org/oae/college-and-career-readiness-standards

Framework for 21st Century Learning

In defining 21st-century learning, the Partnership for 21st Century Skills has embraced key themes and skill areas that represent the essential knowledge for the 21st century: global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; environmental literacy; learning and innovation skills; information, media, and technology skills; and life and career skills. *21 Framework Definitions* (2019).

battelleforkids.org/networks/p21/frameworks-resources

Preface

Secondary CTE programs in Mississippi face many challenges resulting from sweeping educational reforms at the national and state levels. Schools and teachers are increasingly being held accountable for providing applied learning activities to every student in the classroom. This accountability is measured through increased requirements for mastery and attainment of competency as documented through both formative and summative assessments. This document provides information, tools, and solutions that will aid students, teachers, and schools in creating and implementing applied, interactive, and innovative lessons. Through best practices, alignment with national standards and certifications, community partnerships, and a hands-on, student-centered concept, educators will be able to truly engage students in meaningful and collaborative learning opportunities.

The courses in this document reflect the statutory requirements as found in Section 37-3-49, *Mississippi Code of 1972*, as amended (Section 37-3-46). In addition, this curriculum reflects guidelines imposed by federal and state mandates (Laws, 1988, Ch. 487, §14; Laws, 1991, Ch. 423, §1; Laws, 1992, Ch. 519, §4 eff. from and after July 1, 1992; Strengthening Career and Technical Education for the 21st Century Act, 2019 [Perkins V]; and Every Student Succeeds Act, 2015).

Mississippi Teacher Professional Resources

The following are resources for Mississippi teachers:

Curriculum, Assessment, Professional Learning

Program resources can be found at the RCU's website, rcu.msstate.edu.

Learning Management System: An Online Resource

Learning management system information can be found at the RCU's website, under Professional Learning.

Should you need additional instructions, call the RCU at 662.325.2510.

Executive Summary

Pathway Description

The IT pathway is designed to provide the foundation, skills, and knowledge for computer networking, applications, and support. Students will develop the skills necessary to prepare for certification exams and will learn how to develop, support, and integrate computing systems. They will acquire network-planning and -management skills and the ability to provide technical support. The program will provide hands-on experience in computer systems support and skill in network setup and maintenance.

College, Career, and Certifications

Program competencies are designed to prepare students for TestOut IT Fundamentals Pro certification and TestOut Network Pro certification by integrating certification skills throughout the curriculum along with the National Business Education Association standards for Information Technology to assist in student preparation for IT careers.

Grade Level and Class Size Recommendations

It is recommended that students enter this program as a 10th grader. Exceptions to this are a district-level decision based on class size, enrollment numbers, student maturity, and method of CTE delivery. A maximum of 15 students is recommended for this program, with only one class with a teacher at a time.

Student Prerequisites

For students to experience success in the program, the following student prerequisites are suggested:

1. C or higher in English (the previous year)
 2. C or higher in high school-level math (last course taken or the instructor can specify the level of math instruction needed)
 3. Instructor approval and TABE reading score (eighth grade or higher)
- or**
1. TABE reading and math score (eighth grade or higher)
 2. Instructor approval
- or**
1. Instructor approval

Assessment

The latest assessment blueprint for the curriculum can be found at rcu.msstate.edu/curriculum/curriculumdownload.

Applied Academic Credit

The latest academic credit information can be found at mdek12.org/ese/approved-course-for-the-secondary-schools.

Teacher Licensure

The latest teacher licensure information can be found at mdek12.org/oel/apply-for-an-educator-license.

Professional Learning

If you have specific questions about the content of any of the training sessions provided, please contact the RCU at 662.325.2510.

Course Outlines

Option 1—Four 1-Carnegie Unit Courses

This curriculum consists of four 1-credit courses that should be completed in the following sequence:

1. **Information Technology Fundamentals I—Course Code: 992208**
2. **Information Technology Fundamentals II—Course Code: 992209**
3. **Information Technology Networking I—Course Code: 992210**
4. **Information Technology Networking II—Course Code: 992211**

Course Description: Information Technology Fundamentals I

This course covers the explanation of technology and computer hardware and software basics, peripheral devices, mobile technology, and compatibility issues associated with computer hardware.

Course Description: Information Technology Fundamentals II

This course is a continuation of topics from Information Technology Fundamentals I and addresses additional technology topics, including functions, introduction to networking, security risks and prevention, Green IT, and preventative maintenance of computers. Students should be prepared to take the TestOut IT Fundamentals Certification exam at the end of the course. This course should be taken only after students successfully pass Information Technology Fundamentals I.

Course Description: Information Technology Networking I

This course covers the basic concepts of network protocols, services, networking, various network operating systems, networking types, standards, and how data is encoded and transmitted. This course should be taken only after students successfully pass Information Technology Fundamentals I and II.

Course Description: Information Technology Networking II

This course is a continuation of topics from Information Technology Networking I and addresses additional networking topics, including routing and switching hardware, telecommunications, and career options. Students should be prepared to take the TestOut: Network Pro at the end of the course. This course should be taken only after students successfully pass Information Technology Networking I.

Information Technology Fundamentals I—Course Code: 992208

Unit	Unit Name	Hours
1	Introduction to Information Technology	15
2	Hardware	40
3	Software	45
4	Networking	40
Total		140

Information Technology Fundamentals II—Course Code: 992209

Unit	Unit Name	Hours
5	Database	50
6	Programming and Web Development	45
7	Cybersecurity	45
Total		140

Information Technology Networking I—Course Code: 992210

Unit	Unit Name	Hours
8	Networking Fundamentals	40
9	Networking Hardware	50
10	Networking Configuration	50
Total		140

Information Technology Networking II—Course Code: 992211

Unit	Unit Name	Hours
11	Managing Networks	50
12	Network Security	50
13	Career Development	40
Total		140

Option 2—Two 2-Carnegie Unit Courses

This curriculum consists of two 2-credit courses, which should be completed in the following sequence:

1. **Information Technology I—Course Code: 992206**
2. **Information Technology II—Course Code: 992207**

Course Description: Information Technology I

This course covers the explanation of technology and computer hardware basics, compatibility issues, common errors associated with computer hardware, software installation and functions, security risks and prevention, Green IT, and preventative maintenance of computers. Students should be prepared to take the TestOut IT Pro Fundamentals Certification exam at the end of the course.

Course Description: Information Technology II

This course teaches the basic concepts of networking, network operating systems, networking types, standards, and how data is encoded and transmitted. This course is designed to prepare students for the TestOut Network Pro certification exam. This course should be taken only after students successfully pass Information Technology I.

Information Technology I—Course Code: 992206

Unit	Unit Name	Hours
1	Introduction to Information Technology	15
2	Hardware	40
3	Software	45
4	Networking	40
5	Database	50
6	Programming and Web Development	45
7	Cybersecurity	45
Total		280

Information Technology II—Course Code: 992207

Unit	Unit Name	Hours
8	Networking Fundamentals	40
9	Networking Hardware	50
10	Networking Configuration	50
11	Managing Networks	50
12	Network Security	50
13	Career Development	40
Total		280

Career Pathway Outlook

Overview

The IT career pathway will target careers at the professional and technical levels. Students enrolled in these courses should be better prepared to pursue degrees at the community college and four-year college level.

Needs of the Future Workforce

Current and Projected Job Outlook for IT Careers

Description	Current Jobs (2018)	Projected Jobs (2028)	Change (Number)	Change (Percent)	Median Hourly Earning
Computer and Information Research Scientists	350	350	0	0%	\$47.83
Computer Network Support Specialist	1,050	1,170	120	11.4%	\$32.57
Information Security Analyst	370	480	110	29.7%	\$35.75
Computer Systems Analysts	2,200	2,320	120	5.5%	\$32.38
Network and Computer Systems Administrators	1,340	1,360	20	1.5%	\$34.00
Software Developers, Applications	950	1,160	210	22.1%	\$42.32
Software Developers, Systems Software	980	1010	30	3.1%	\$41.32

Source: Mississippi Department of Employment Security; mdes.ms.gov (2021).

Perkins V Requirements and Academic Infusion

The IT curriculum meets Perkins V requirements of introducing students to and preparing them for high-skill, high-wage occupations in IT fields. It also offers students a program of study, including secondary, postsecondary, and institutions of higher learning courses, that will further prepare them for IT careers. Additionally, this curriculum is integrated with academic college- and career-readiness standards. Finally, it focuses on ongoing and meaningful professional development for teachers as well as relationships with industry.

Transition to Postsecondary Education

The latest articulation information for secondary to postsecondary can be found at the Mississippi Community College Board website, mccb.edu.

Best Practices

Innovative Instructional Technologies

Classrooms should be equipped with tools that will teach today's digital learners through applicable and modern practices. The IT educator's goal should be to include teaching strategies that incorporate current technology. To make use of the latest online communication tools—wikis, blogs, podcasts, and social media platforms, for example—the classroom teacher is encouraged to use a learning management system that introduces students to education in an online environment and places more of the responsibility of learning on the student.

Differentiated Instruction

Students learn in a variety of ways, and numerous factors—students' background, emotional health, and circumstances, for example—create unique learners. By providing various teaching and assessment strategies, students with various learning preferences can have more opportunities to succeed.

CTE Student Organizations

Teachers should investigate opportunities to sponsor a student organization. There are several here in Mississippi that will foster the types of learning expected from the IT curriculum. SkillsUSA, Technology Student Association (TSA), and Future Business Leaders of America (FBLA) are examples of student organizations with many outlets for IT. Student organizations provide participants and members with growth opportunities and competitive events. They also open the doors to the world of IT careers and scholarship opportunities.

Cooperative Learning

Cooperative learning can help students understand topics when independent learning cannot. Therefore, you will see several opportunities in the IT curriculum for group work. To function in today's workforce, students need to be able to work collaboratively with others and solve problems without excessive conflict. The IT curriculum provides opportunities for students to work together and help each other complete complex tasks. There are many field experiences within the IT curriculum that will allow and encourage collaboration with professionals currently in the IT field.

Work-Based Learning

Work-based learning is an extension of understanding competencies taught in the IT classroom. This curriculum is designed in a way that necessitates active involvement by the students in the community around them and the global environment. These real-world connections and applications link all types of students to knowledge, skills, and professional dispositions. Work-based learning should encompass ongoing and increasingly more complex involvement with local companies and IT professionals. Thus, supervised collaboration and immersion into the industry around the students are keys to students' success, knowledge, and skills development.

Professional Organizations

Association of Career and Technical Education
acteonline.org

International Society for Technology in Education
iste.org

Mississippi Association for Career and Technical Education
mississippiacte.com

Mississippi Educational Computing Association
ms-meca.org

Student Organizations

Future Business Leaders of America
fbla-pbl.org

SkillsUSA
skillsusa.org

Technology Student Association
tsaweb.org

Using This Document

Competencies and Suggested Objectives

A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students are expected to receive instruction on all competencies. The suggested objectives represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level. Teachers are welcome to teach the competencies in other ways than the listed objectives if it allows for mastery of the competencies. Teachers are also allowed to teach the units and competencies in the order that they prefer, as long as they teach necessary material allotted for that specific course or credit they are teaching at the time.

Teacher Resources

Teacher resources for this curriculum may be found in multiple places. Many program areas have teacher resource documents that accompany the curriculum and can be downloaded from the same site as the curriculum. The teacher resource document contains references, lesson ideas, websites, teaching and assessment strategies, scenarios, skills to master, and other resources divided by unit. This document could be updated periodically by RCU staff. Please check the entire document, including the entries for each unit, regularly for new information. If you have something you would like to add or have a question about the document, call or email the RCU's instructional design specialist for your program. The teacher resource document can be downloaded at rcu.msstate.edu/curriculum/curriculumdownload.aspx. All teachers should request to be added to the Canvas Resource Guide for their course. This is where all resources will be housed in the future if they are not already. To be added to the guide, [send a Help Desk ticket to the RCU](#) by emailing helpdesk@rcu.msstate.edu.

Perkins V Quality Indicators and Enrichment Material

Some of the units may include an enrichment section at the end. If the IT program is currently using the Mississippi Career Planning and Assessment System (MS-CPAS) as a measure of accountability, the enrichment section of material will not be tested. If this is the case, it is suggested to use the enrichment material when needed or desired by the teacher and if time allows in the class. This material will greatly enhance the learning experiences for students. If, however, the IT program is using a national certification, work-based learning, or other measure of accountability that aligns with Perkins V as a quality indicator, this material could very well be tested on that quality indicator. It is the responsibility of the teacher to ensure all competencies for the selected quality indicator are covered throughout the year.

Unit 1: Introduction to Information Technology

Competencies and Suggested Objectives

1. Research educational, occupational, and leadership opportunities in IT. ^{DOK2}
 - a. Review student rules and regulations for the local school.
 - b. Compare and contrast local program policies, procedures, and expectations to industry policies, procedures, and expectations.
 - c. Identify and describe leadership opportunities available from CTE student organizations in the school and community.
 - d. Preview the school's technology acceptable-use policy.
2. Identify, discuss, and apply safety procedures in the computer classroom and lab. ^{DOK2}
 1. Discuss the proper classroom and personal safety procedures, including fire extinguishers, electrical, ladders, clothing, jewelry, eye protection, and so forth.
 2. Care for and correctly use computer hardware.
 3. Identify potential hazards when working with technology equipment.
 4. Explore the environmental impact related to technology.
3. Publish and communicate with peers, experts, and other audiences using technology. ^{DOK2}
 - a. Research safety issues related to telecommunications and internet academic standards, if applicable.
 - b. Develop personal safety guidelines that will be used when using telecommunications and the internet.
 - c. Describe the legal implications related to the computer industry, including software copyright issues, software licensing, and internet ethics and policies.
 - d. Use browsers, search engines, and email.
 - e. Communicate via electronic media.
 - f. Research, create, and present a presentation/project on emerging technologies, practices, trends, and issues associated with IT.

Unit 2: Hardware

Competencies and Suggested Objectives
1. Explore motherboard components. ^{DOK2} <ol style="list-style-type: none">Identify internal components and the purpose of the following:<ul style="list-style-type: none">ProcessorPowerStorageExpansion slotsCoolingMemoryInstall and upgrade components.Troubleshoot common motherboard issues.
2. Examine the basic wired and wireless peripherals, such as input, output, and combination devices and the purpose of each. ^{DOK2} <ol style="list-style-type: none">Properly connect wired and wireless peripherals.Differentiate between the types of cables and connectors.Troubleshoot peripherals.
3. Manipulate storage on computer systems. ^{DOK2} <ol style="list-style-type: none">Classify types of storage.Install storage media.Create volumes and format drives.Perform disk maintenance.Troubleshoot storage.
4. Design and troubleshoot a basic workstation. ^{DOK2}

Unit 3: Software

Competencies and Suggested Objectives	
1. Compare and contrast the functions and features of commonly used computer operating systems (OSs). ^{DOK2}	<ol style="list-style-type: none">a. Identify the uses and features of common desktop operating systems, such as macOS, Windows, and Linux.b. Install operating systems running in a virtual environment.c. Identify the uses and features of common mobile operating systems.d. Identify the basic features of an operating system.e. Demonstrate the uses of an operating system.f. Explain and utilize other system software such as: BIOS, CMOS, and firmware.g. Utilize device manager.
2. Identify common software applications and the purpose of each. ^{DOK1}	<ol style="list-style-type: none">a. Demonstrate the proper uses of productivity software, such as Microsoft Office applications, email, and desktop publishing.b. Explain collaboration software, such as online workspaces, cloud storage, screen sharing, videoconferencing software, instant messaging (IM) clients, VoIP, and email.c. Manipulate utility software, such as antivirus, diagnostic software, device drivers, and file compression utilities.d. Examine specialized software, such as computer-aided design (CAD), graphic design, gaming, multimedia, virtualization, and industrial software.e. Identify various software platforms, such as mobile, desktop, and web based.f. Identify common file types, including document, audio, image, video, executables, and compression formats.
3. Demonstrate software management best practices. ^{DOK2}	<ol style="list-style-type: none">a. Install/uninstall OS features, applications, and drivers.b. Install updates and patches for OS, drivers, applications, and security software.c. Identify the proper versions of software that are compatible with various platforms.d. Define various licensing procedures, such as product keys, site licenses, multiuser licenses, and freeware.e. Perform backup operations.f. Configure local and network printing.
4. Demonstrate file management best practices. ^{DOK2}	<ol style="list-style-type: none">a. Manage files and folders in the Windows files system.b. Manage file and New Technology File System (NTFS) permissions.c. Use command line utilities.d. Create a virtual machine.
5. Troubleshoot various software issues. ^{DOK3}	

Unit 4: Networking

Competencies and Suggested Objectives	
1. Develop skills to design, deploy, and administer networks. ^{DOK2}	<ol style="list-style-type: none">a. Identify basic network connectivity concepts.b. Differentiate between network architecture and topologies.c. Identify network hardware infrastructure components.
2. Design and develop network infrastructure. ^{DOK2}	<ol style="list-style-type: none">a. Compare and contrast network cabling solutions.b. Set up a basic wired network.c. Compare and contrast components of a wireless network.d. Set up a basic wireless network.e. Manage mobile and Bluetooth devices.
3. Describe internet technologies. ^{DOK1}	<ol style="list-style-type: none">1. Configure browsers for optimal use.2. Enable and use a proxy server.3. Describe the Internet of Things and evaluate common IoT devices.4. Describe various internet communications technologies.5. Define and describe the uses of cloud computing.
4. Troubleshoot various networking issues. ^{DOK2}	

Unit 5: Database

Competencies and Suggested Objectives
1. Discuss database concepts. ^{DOK1} <ol style="list-style-type: none">Describe the advantages of using a database rather than a flat file to store information.Explain database design and purpose.Describe data access and manipulation.
2. Explore objects of a relational database. ^{DOK2} <ol style="list-style-type: none">Identify differences between relational and nonrelational databases.Create database tables with different types of relationships.Create reports to analyze data.
3. Perform basic query's using Structured Query Language (SQL). ^{DOK2} <ol style="list-style-type: none">Construct SQL commands to retrieve all data from a table.Construct SQL commands to retrieve data matching criteria.Construct SQL commands to add and delete records.
4. Troubleshoot various database issues. ^{DOK3}

Unit 6: Programming and Web Development

Competencies and Suggested Objectives
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|--|
| 1. Discuss the various web design languages, such as JavaScript, HTML, and CSS. ^{DOK1} |
| 2. Analyze and use various logic and programming techniques along with fundamental data types. ^{DOK2} <ol style="list-style-type: none">Analyze and use the following:<ul style="list-style-type: none">PseudocodeFlow chartsLooping and branchingFunctionVariables and constantsStringers, integers, and floats |
| 3. Develop a basic web page using HTML, CSS, and JavaScript. ^{DOK3} |
| 4. Troubleshoot various programming and web development issues. ^{DOK3} |

Enrichment

- | |
|--|
| 1. Use and explore other languages, such as Python, C++, and more. |
|--|

Unit 7: Cybersecurity

Competencies and Suggested Objectives
1. Analyze basic security threats. ^{DOK2}
2. Discuss security best practices. ^{DOK2} <ul style="list-style-type: none">a. Password managementb. Device hardeningc. Wi-Fi securityd. Antivirus/antimalware softwaree. Data encryption
3. Describe common threats to data confidentiality, integrity, and availability. ^{DOK1}
4. Configure corporate data security. ^{DOK3} <ul style="list-style-type: none">a. Differentiate between the different types of authentications including multifactor and single sign-on.b. Plan, develop, and implement authorization through permissions, access control lists (ACLs), and principle of least privilege.c. Install and configure an uninterruptable power supply (UPS).d. Examine various backup strategies.
5. Configure device security. ^{DOK3} <ul style="list-style-type: none">a. Configure firewalls for optimal device protection.b. Secure devices on home wireless network.c. Configure a remote wipe on a device.
6. Troubleshoot various cybersecurity issues. ^{DOK3}

Unit 8: Networking Fundamentals

Competencies and Suggested Objectives	
1. Identify different network classifications. ^{DOK1}	<ol style="list-style-type: none">a. Differentiate between peer-to-peer and client servers.b. Differentiate between geographical networks, such as local area network (LAN), wide area network (WAN,) and so forth.c. Discuss the differences in intranet, internet, and extranet.
2. Describe the common physical and logical topologies. ^{DOK1}	
3. Examine devices, services, and protocols within each layer of the Open Systems Interconnection (OSI) model. ^{DOK2}	
4. Explain protocols and ports within the Transmission Control Protocol/Internet Protocol (TCP/IP) suite. ^{DOK2}	
5. Examine the various numbering systems used in networking. ^{DOK2}	<ol style="list-style-type: none">a. Convert decimal to binary.b. Convert decimal to hexadecimal.

Unit 9: Networking Hardware

Competencies and Suggested Objectives	
1. Recognize network media types. ^{DOK2}	<ul style="list-style-type: none">a. Investigate the characteristics of twisted pair cabling in networks.b. Investigate the characteristics of coaxial cabling in networks.c. Investigate the characteristics of fiber-optic cabling in networks.d. Implement and troubleshoot different wiring schemes.
2. Examine network hardware, including layers 1, 2, and 3 devices. ^{DOK2}	<ul style="list-style-type: none">a. Identify and define hubs, bridges, and switches as layers 1 and 2 network hardware devices.b. Identify and define routers, firewalls, and layer 3 switches as layer 3 network hardware devices.c. Implement wired and wireless devices.d. Troubleshoot physical connectivity.

Unit 10: Networking Configuration

Competencies and Suggested Objectives	
1. Recognize the internet protocol (IP) addressing scheme. ^{DOK2}	<ul style="list-style-type: none">a. Define common IP concepts, including IPv4, IPv6, APIPA, and subnetting.b. Differentiate between classful and classless IP addresses.c. Configure IPv4 addressesd. Configure IPv6 addresses.e. Troubleshoot IP addresses.
2. Configure routers and switches. ^{DOK2}	<ul style="list-style-type: none">a. Configure ports and virtual local area networks (VLANs).b. Implement Spanning Tree.c. Implement Quality of Service (QoS).d. Troubleshoot routers and switches.
3. Configure wireless and Voice over Internet Protocol (VoIP.) ^{DOK2}	<ul style="list-style-type: none">a. Connect smart and mobile devices.b. Configure trunking.c. Troubleshoot wireless and VoIP.

Unit 11: Managing Networks

Competencies and Suggested Objectives	
1. Explore dynamic host configuration protocol (DHCP) services. ^{DOK2}	<ol style="list-style-type: none">a. Define common DHCP concepts, including discover; offer; request; acknowledge (DORA), scope, relay agent, reservations, and exclusions.b. Implement a DHCP server.c. Configure DHCP options, snooping, and relay agent.d. Troubleshoot DHCP services.
2. Explore domain name system (DNS) services. ^{DOK2}	<ol style="list-style-type: none">a. Define common DNS concepts including fully qualified domain name (FQDN), DNS zones, different types of records, and DNS lookup.b. Configure DNS addresses.c. Create standard DNS zones.d. Troubleshoot name resolutions.
3. Explore network segmentation. ^{DOK2}	<ol style="list-style-type: none">a. Scan for Internet of Things (IoT) devices.b. Scan networks for vulnerabilities, exploits, attacks, and threats.c. Create and configure VLANsd. Troubleshoot VLANs.
4. Explore various types of backup systems and restore tasks. ^{DOK2}	<ol style="list-style-type: none">a. Backup and restore file history.b. Backup and restore network configuration.c. Verify and troubleshoot backup systems.

Unit 12: Network Security

Competencies and Suggested Objectives
1. Implement firewalls and security appliances. ^{DOK2} <ol style="list-style-type: none">Configure a host and perimeter firewall.Configure a demilitarized zone (DMZ).Configure a network security appliance, such as an antivirus-scanning device, content-filtering device, and so forth.Troubleshoot firewalls and security appliances.
2. Implement security on switches and wireless networks. ^{DOK2} <ol style="list-style-type: none">Configure the wireless network for optimal security.Configure switches for optimal security including disabling ports.Troubleshoot security on switches and wireless networks.
3. Apply security standards to passwords and network services. ^{DOK2} <ol style="list-style-type: none">Disable traffic permissions.Implement strong password policies, such as multifactor authentications.Explore Linux account services.Troubleshoot security standards to passwords and network services.
4. Create remote connections and virtual private networks (VPNs). ^{DOK2} <ol style="list-style-type: none">Configure remote access VPNs.Configure mobile devices' VPN connections.Troubleshoot remote connections and VPNs.
5. Analyze network exploits. ^{DOK2} <ol style="list-style-type: none">Implement an intrusion prevention system (IPS).Mitigate cybersecurity attacks.Implement a physical cybersecurity strategies.Troubleshoot network exploits.

Unit 13: Career Development

Competencies and Suggested Objectives	
1. Investigate and demonstrate career development skills. ^{DOK1}	<ol style="list-style-type: none">a. Investigate career opportunities and emerging technologies in IT.b. Locate resources for a job opening in an IT career field.c. Prepare, in an acceptable format, a cover letter, a résumé, and a follow-up letter using word-processing software.d. Complete a job application.e. Demonstrate appropriate job interview skills in a real or mock interview.
2. Use appropriate communication skills and professional behavior when communicating with clients and coworkers. ^{DOK1}	<ol style="list-style-type: none">a. Practice appropriate communication skills, including speaking clearly and concisely, using tact and discretion, avoiding jargon, asking pertinent questions, and exercising listening skills.b. Practice appropriate professional behavior, including maintaining a positive attitude and tone of voice, avoiding arguments or defensiveness, and respecting clients' privacy and property.c. Discuss the impact of social media profiles.
3. Research opportunities related to IT and participate in field experiences or simulations. ^{DOK3}	<ol style="list-style-type: none">a. Investigate educational opportunities related to IT.b. Describe national standards and certification/licensing procedures related to IT.c. Describe the role of trade organizations, associations, and unions related to IT.d. Participate in a school-to-careers activity (e.g., shadowing, mentoring, simulations, career fair, etc.).e. Visit an industry/computer center and, analyze hardware and software usage and needs, educational training for personnel, tasks performed by personnel, and the future outlook for those jobs.
4. Research and identify the benefits of industry certifications for various information technology careers. ^{DOK2}	<ol style="list-style-type: none">a. Compare and contrast entry-level and career-level certifications.

Student Competency Profile

Student's Name: _____

This record is intended to serve as a method of noting student achievement of the competencies in each unit. It can be duplicated for each student, and it can serve as a cumulative record of competencies achieved in the course.

In the blank before each competency, place the date on which the student mastered the competency.

Unit 1: Introduction to Information Technology	
	1. Research educational, occupational, and leadership opportunities in IT.
	2. Identify, discuss, and apply safety procedures in the computer classroom and lab.
	3. Publish and communicate with peers, experts, and other audiences using technology.
Unit 2: Hardware	
	1. Explore motherboard components.
	2. Examine the basic wired and wireless peripherals, such as input, output, and combination devices and the purpose of each.
	3. Manipulate storage on computer systems.
	4. Design and troubleshoot a basic workstation.
Unit 3: Software	
	1. Compare and contrast the functions and features of commonly used computer operating systems (OSs).
	2. Identify common software applications and the purpose of each.
	3. Demonstrate software management best practices.
	4. Demonstrate file management best practices.
	5. Troubleshoot various software issues.
Unit 4: Networking	
	1. Develop skills to design, deploy, and administer networks.
	2. Design and develop network infrastructure.
	3. Describe internet technologies.
	4. Troubleshoot various networking issues.

Unit 5: Database		
	1.	Discuss database concepts.
	2.	Explore objects of a relational database.
	3.	Perform basic query's using Structured Query Language (SQL).
	4.	Troubleshoot various database issues.
Unit 6: Programming and Web Development		
	1.	Discuss the various web design languages such as JavaScript, HTML, and CSS.
	2.	Analyze and use various logic and programming techniques along with fundamental data types.
	3.	Develop a basic web page using HTML, CSS, and JavaScript.
	4.	Troubleshoot various programming and web development issues.
Unit 7: Cybersecurity		
	1.	Analyze basic security threats.
	2.	Discuss security best practices.
	3.	Describe common threats to data confidentiality, integrity, and availability.
	4.	Configure corporate data security.
	5.	Configure device security.
	6.	Troubleshoot various cybersecurity issues.
Unit 8: Networking Fundamentals		
	1.	Identify different network classifications.
	2.	Describe the common physical and logical topologies.
	3.	Examine devices, services, and protocols within each layer of the Open Systems Interconnection (OSI) model.
	4.	Explain protocols and ports within the Transmission Control Protocol/Internet Protocol (TCP/IP) suite.
	5.	Examine the various numbering systems used in networking.
Unit 9: Networking Hardware		
	1.	Recognize network media types.
	2.	Examine network hardware, including layers 1, 2, and 3 devices.
Unit 10: Networking Configuration		
	1.	Recognize the internet protocol (IP) addressing scheme.
	2.	Configure routers and switches.
	3.	Configure wireless and Voice over Internet Protocol (VoIP).

Unit 11: Managing Networks	
1.	Explore dynamic host configuration protocol (DHCP) services.
2.	Explore domain name system (DNS) services.
3.	Explore network segmentation.
4.	Explore various types of backup systems and restore tasks.
Unit 12: Network Security	
1.	Implement firewalls and security appliances.
2.	Implement security on switches and wireless networks.
3.	Apply security standards to passwords and network services.
4.	Create remote connections and virtual private networks (VPNs).
5.	Analyze network exploits.
Unit 13: Career Development	
1.	Investigate and demonstrate career development skills.
2.	Use appropriate communication skills and professional behavior when communicating with clients and coworkers.
3.	Research opportunities related to IT and participate in field experiences or simulations.
4.	Research and identify the benefits of industry certifications for various information technology careers.

Appendix A: Industry Standards

National Business Education Association: Information Technology Standards

	Units	1	2	3	4	5	6	7	8	9	10	11	12	13
Standards														
II		X												X
III		X												X
IV			X											
V				X										
VI				X										
VII				X										
X						X								
XII							X							
XIII					X				X	X	X	X		
XV								X					X	
XVI		X												X
XVIII														X

II – Information Literacy

Achievement Standard: Gather, evaluate, synthesize, use, cite, and disseminate information from technology sources.

III – Digital Citizenship

Achievement Standard: Demonstrate respectful, responsible, inclusive, and ethical behavior in a digital world.

IV – Devices and Components

Achievement Standard: Describe current and emerging devices and components; configure, install, and upgrade equipment; diagnose problems; and repair hardware.

V – Operating Systems

Achievement Standard: Identify, evaluate, select, install, use, upgrade, and customize operating systems. Diagnose and solve problem with various types of operating system utilities.

VI – Input Technologies

Achievement Standard: Use various input technologies to enter and manipulate information appropriately.

VII – Applications

Achievement Standard: Identify, evaluate, select, install, use, upgrade, troubleshoot, and customize applications.

X – Database Management Systems

Achievement Standard: Use, plan, develop, and maintain database management systems.

XII – Programming and Application Development

Achievement Standard: Design, develop, test, and implement programs and applications.

XIII – Data and Networking Infrastructures

Achievement Standard: Develop the skills to design, deploy, and administer networks and telecommunications systems.

XV – Security and Risk Management

Achievement Standard: Design and implement security and risk management policies and procedures for information technology.

XVI – End-User Support and Training

Achievement Standard: Develop the technical and interpersonal skills and knowledge to train and support a diverse user community.

XVIII – Information Technology Careers

Achievement Standard: Explore career opportunities in information technology.

**TestOut IT Fundamentals Pro
Content Standards**

	Units	1	2	3	4	5	6	7	8	9	10	11	12	13
Standards														
TITF1			X											
TITF2				X										
TITF3				X										
TITF4					X									
TITF5						X								
TITF6							X							
TITF7								X						

TITF1 – Hardware

TITF2 – Software

TITF3 – Operating Systems

TITF4 – Networking

TITF5 – Databases

TITF6 – Programming

TITF7 – Security

**TestOut IT Networking Pro
Content Standards**

	Units	1	2	3	4	5	6	7	8	9	10	11	12	13
Standards														
TNP1									X	X				
TNP2											X			
TNP3												X		
TNP4													X	
TNP5			X	X	X	X	X	X	X	X	X	X	X	

TNP1 – Hardware

TNP2 – Configuration

TNP3 – Management

TNP4 – Security

TNP5 – Troubleshooting