



**Computer Engineering III:
Computer Repairs, Computer-Control Circuits**

Second Semester

Course Information

Grade(s):	10-12
Discipline/Course:	Technology Education
Course Title:	Computer Engineering III: Computer Repairs, Computer-Control Circuits, Semester II
Prerequisite(s):	Computer Engineering II: Applied Circuit Design and Microcomputers <i>or</i> Computer Engineering I: Introduction to Digital electronics with Teacher’s permission <i>or</i> Computer Engineering III: Computer Repairs, Computer-Control Circuits, First Semester
Course Description: <i>Program of Studies</i>	Building on the foundations of Computer Engineering I and II, students will delve into the world of IT. This course focuses on the standards aligned to CompTIA A+ (a standard IT certification) expanding on ‘how a computer works’. Projects revolve around the use of a computer workstation setup and maintained by individual students. Topics include: computer hardware & software, peripherals, microcomputers, mobile devices, basic networking, and IT Professionalism. The content of this course is aligned with CompTIA A+ standards.
Course Essential Questions:	<ul style="list-style-type: none"> ● What are the different types of printers? ● What is the process for configuring a printer? ● What is the difference between mobile and laptop operating systems? ● What is the difference between mobile and laptop devices? ● How can a mobile device or laptop be reset to factory standards? ● How do mobile devices connect to a network? ● How can a computer system be protected? Digitally? Physically? ● What is the importance of securing computer devices? ● What is social engineering? ● What is malware, how can it get onto a device and how can it be removed from a device? ● What is licensing? ● What is (multi-factor) authentication? ● How are digital citizenship and security related? ● Why is the process of “turning a device off, then back on again” the first step of troubleshooting?

	<ul style="list-style-type: none"> ● How can data be recovered? ● What is ethernet? ● What is a computer network? ● What is WAN? LAN? ● What hardware is necessary to establish a network? ● What is “sneakernet”? ● What are service models? ● What is a twisted-pair cable? ● Networking allows computer devices to talk with one another. ● Network protocols are the rules devices follow when talking with one another.
Course Enduring Understandings:	<ul style="list-style-type: none"> ● Computers and laptops need to be configured the way we want to use them. ● Mobile devices need to be configured the way we want to use them. ● Devices need to be protected from outside attacks. ● Data needs to be regularly backed-up in case of outside attacks on your devices. ● Data may be recovered following a malicious attack, but not always. ● Digital citizenship and security are related. ● Recognize common problems: start-up, hardware, mechanical. ● Resolve common problems: start-up, hardware, mechanical. ● Apply the steps of troubleshooting. ● Networking allows computer devices to talk with one another. ● Network protocols are the rules devices follow when talking with one another.
Duration / Credit(s):	Semester / 0.5 credit
Course Materials/Resources:	CompTIA A+
FPS Course Academic Expectation(s):	SE: Synthesizing and Evaluating UCT: Using Communication Tools

Semester at a Glance (Units)	Unit 1: Peripherals (3-5 weeks) Unit 2: Security (4-6 weeks) Unit 3: Troubleshooting (3-5 weeks) Unit 4: Networking (3-5 weeks)
---	--

Unit Number and Title:	Unit 1: Peripherals
Duration:	3-5 weeks
Resource(s):	Computers, lab tools and equipment, various consumables.
Unit Overview:	Work with additional peripherals to expand the capability of a computer.
Learning Goals	
Standard(s):	<u>Connecticut Technology Education:</u> CADD.04.03 Define and apply computer terminology AVC.03 Demonstrate the use of appropriate communication equipment for the delivery of a message. <u>CompTIA A+:</u> (Core 1) 1.1 Given a scenario, install components within the display of a laptop 1.4 Compare and contrast characteristics of various types of other mobile devices. 3.6 Explain the purposes and uses of various peripheral types. 3.9 Given a scenario, install and configure common devices. 3.10 Given a scenario, configure SOHO multifunction devices/printers and settings. 3.11 Given a scenario, install and maintain various print technologies. 5.6 Given a scenario, troubleshoot printers. (Core 2) 1.1 Compare and contrast common operating system types and their purposes. 1.3 Summarize general OS installation considerations and upgrade methods. 2.8 Given a scenario, implement methods for securing mobile devices. 3.4 Given a scenario, troubleshoot mobile OS and application issues.
Essential Question(s):	<ul style="list-style-type: none"> ● What are the different types of printers? ● What is the process for configuring a printer? ● What is the difference between mobile and laptop operating systems? ● What is the difference between mobile and laptop devices?

	<ul style="list-style-type: none"> ● How can a mobile device or laptop be reset to factory standards? ● How do mobile devices connect to a network?
Enduring Understanding(s):	<ul style="list-style-type: none"> ● Computers and laptops need to be configured the way we want to use them. ● Mobile devices need to be configured the way we want to use them.
Learning Goal(s): <i>Students will be able to use their learning to:</i> (Content/ Skills)	<p>Content: (Students will know...)</p> <ul style="list-style-type: none"> ● there are various types of printers depending on one's needs. ● what computer peripherals are and how to connect them to a personal device or network. ● there are different mobile operating systems. <p>Skills: (Students will be able to...)</p> <ul style="list-style-type: none"> ● install and use printers. ● identify mobile operating systems. ● connect various peripherals to their devices.

Unit Number and Title:	Unit 2: Security
Duration:	4-6 weeks
Resource(s):	Computers, lab tools and equipment, various consumables
Unit Overview:	Security is a top priority for computer devices; explore the methods of keeping computer hardware physically and digitally safe.
Learning Goals	
Standard(s):	<u>Connecticut Technology Education:</u> CADD.04.03 Define and apply computer terminology <u>CompTIA A+:</u> (Core 1) (Core 2) 2.1 Summarize the importance of physical security measures. 2.2 Explain logical security concepts. 2.3 Compare and contrast wireless security protocols and authentication methods. 2.4 Given a scenario, detect, remove, and prevent malware using appropriate tools and methods. 2.5 Compare and contrast social engineering, threats, and vulnerabilities. 2.7 Given a scenario, implement security best practices to secure a workstation. 2.8 Given a scenario, implement methods for securing mobile devices. 2.9 Given a scenario, implement appropriate data destruction and disposal methods. 2.10 Given a scenario, configure security on SOHO wireless and wired networks. 3.2 Given a scenario, troubleshoot and resolve PC security issues. 4.6 Explain the processes for addressing prohibited content/activity, and privacy, licensing, and policy concepts.
Essential Question(s):	<ul style="list-style-type: none"> ● How can a computer system be protected? Digitally? Physically? ● What is the importance of securing computer devices?

	<ul style="list-style-type: none"> ● What is social engineering? ● What is malware, how can it get onto a device and how can it be removed from a device? ● What is licensing? ● What is (multi-factor) authentication? ● How are digital citizenship and security related?
Enduring Understanding(s):	<ul style="list-style-type: none"> ● Devices need to be protected from outside attacks. ● Data needs to be regularly backed-up in case of outside attacks on your devices. ● Data may be recovered following a malicious attack, but not always. ● Digital citizenship and security are related.
Learning Goal(s): <i>Students will be able to use their learning to:</i> (Content/ Skills)	<p>Content: (Students will know...)</p> <ul style="list-style-type: none"> ● that computer security is important. ● the various methods of protecting a computer system. ● the purpose of an Acceptable Use Policy. ● that there are different types of malicious software. <p>Skills: (Students will be able to...)</p> <ul style="list-style-type: none"> ● add security measures to a computer device to protect it. ● review the license agreement of software as it is installed to a computer. ● create computer policies that govern a computer system/network. ● practice measures to prevent social engineering. ● backup data to a cloud server or local server. ● identify and discuss the different aspects of digital citizenship, including online safety, privacy and security, digital literacy, and communication.

Unit Number and Title:	Unit 3: Troubleshooting
Duration:	3-5 weeks
Resource(s):	Computers, lab tools and equipment, various consumables
Unit Overview:	Computing devices constantly have issues that need to be remediated, this unit focuses on the process of solving computer problems.
Learning Goals	
Standard(s):	<p><u>Connecticut Technology Education:</u> CADD.04.03 Define and apply computer terminology. AVC.02.02 Read, interpret and utilize media communication equipment instruction manuals, troubleshooting guides, and specification requirements.</p> <p><u>CompTIA A+:</u> (Core 1) 5.1 Given a scenario, use the best practice methodology to resolve problems. 5.2 Given a scenario, troubleshoot problems related to motherboards, RAM, CPUs, and power. 5.3 Given a scenario, troubleshoot hard drives and RAID arrays. 5.4 Given a scenario, troubleshoot video, projector, and display issues. 5.5 Given a scenario, troubleshoot common mobile device issues while adhering to the appropriate procedures.</p> <p>(Core 2) 1.3 Summarize general OS installation considerations and upgrade methods. 1.4 Given a scenario, use appropriate Microsoft command line tools. 1.5 Given a scenario, use Microsoft operating system features and tools. 1.6 Given a scenario, use Microsoft Windows Control Panel utilities. 4.3 Given a scenario, implement basic disaster prevention and recovery methods.</p>
Essential Question(s):	<ul style="list-style-type: none"> Why is the process of “turning a device off, then back on again” the first step of

	troubleshooting? <ul style="list-style-type: none"> ● How can data be recovered?
Enduring Understanding(s):	<ul style="list-style-type: none"> ● Recognize common problems: start-up, hardware, mechanical. ● Resolve common problems: start-up, hardware, mechanical. ● Apply the steps of troubleshooting.
Learning Goal(s): <i>Students will be able to use their learning to:</i> (Content/ Skills)	Content: (Students will know...) <ul style="list-style-type: none"> ● the PC boot sequence. ● troubleshooting steps. ● basic recovery methods Skills: (Students will be able to...): <ul style="list-style-type: none"> ● use diagnostic tools to discover issues. ● recover data from a cloud server or local server. ● run system recovery modes to get back to the operating system. ● reinstall operating systems

Unit Number and Title:	Unit 4: Networking
Duration:	3-5 weeks
Resource(s):	Computers, lab tools and equipment, various consumables
Unit Overview:	Review computer networking and understand how computer devices are set up to talk to each other.
Learning Goals	
Standard(s):	<u>Connecticut Technology Education:</u> CADD.02.06 Send and access information through a network. CADD.04.03 Define and apply computer terminology <u>CompTIA A+:</u> (Core 1) 2.2 Compare and contrast common networking hardware devices. 2.3 Given a scenario, install and configure a basic wired/wireless SOHO network. 2.6 Explain common network configuration concepts. 2.7 Compare and contrast Internet connection types, network types, and their features. 3.1 Explain basic cable types, features, and their purposes. 3.2 Identify common connector types. (Core 2) 2.10 Given a scenario, configure security on SOHO wireless and wired networks. 4.1 Compare and contrast best practices associated with types of documentation.
Essential Question(s):	<ul style="list-style-type: none"> ● What is ethernet? ● What is a computer network? ● What is WAN? LAN? ● What hardware is necessary to establish a network? ● What is “sneakernet”? ● What are service models? ● What is a twisted-pair cable?

Enduring Understanding(s):	<ul style="list-style-type: none"> ● Networking allows computer devices to talk with one another. ● Network protocols are the rules devices follow when talking with one another.
Learning Goal(s): <i>Students will be able to use their learning to:</i> (Content/ Skills)	<p>Content: (Students will know...)</p> <ul style="list-style-type: none"> ● networking equipment. ● network connectors. ● the cloud. ● communication protocols. <p>Skills: (Students will be able to...):</p> <ul style="list-style-type: none"> ● identify and use networking equipment. ● configure a basic home network. ● demonstrate cloud computing. ● make network cables.