Computer Engineering III:
Computer Repairs, Computer-Controlled Circuits

First Semester

Course Information

Grade(s):	10-12
Discipline/Course:	Technology Education
Course Title:	Computer Engineering III: Computer Repairs, Computer-Control Circuits, Semester I
Prerequisite(s):	Computer Engineering II: Applied Circuit Design and Microcomputers *or* Computer Engineering I: Introduction to Digital electronics with Teacher's permission
Course Description: *Program of Studies*	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:	● Why is it important to use professional communication in the IT industry? ● What is the importance of documentation? ● What is the process for making a computer or system wide change? ● How has social media and artificial intelligence (AI) changed the world we live in? ● What ethics need to be considered when using social media or AI? ● What is a computer? ● What does the word binary mean relative to the operation and use of computers? ● What is BIOS/UEFI? ● What does "boot" mean regarding computers and how does one boot a computer? ● What is a command line interface? ● What is an operating system? ● What is a graphical user interface? ● What is an operating system? ● What is Windows? Linux? Mac? ● What is the difference between a GUI and command line operating system?

	● What is BIOS? ● What is form factor? ● What are the connectors for graphics/displays? ● What is RAID?
Course Enduring Understandings:	● IT support is essential for the smooth operation of any school or business ● End users must be able to trust their IT professionals and be willing to provide accurate information about problems and make system changes. ● AI has made it easier to create and share content. ● AI is being used to moderate and monitor social media content. ● Computer systems have to be physically connected with peripherals using various cables and connectors, in order for the system to work. ● Operating systems must be installed onto computers and networks, and then the various required software also loaded on for the system to function as planned. ● Computers use operating systems and software which must be installed on the computer drive before it will function as planned. ● Computer operating systems and software must be managed and configured. ● Computers need command-line interface commands to operate. ● Hardware must be integrated correctly in order for a computer to function. ● Computers utilize common industry connectors to physically connect peripherals or other components. ● Specific hardware needs to be carefully selected when building a computer.
Duration / Credit(s):	Semester / 0.5 credits
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: Digital Citizenship, IT Support, & Professionalism (3-5 weeks) Unit 2: PC Basics (3-4 weeks) Unit 3: Software (3-4 weeks) Unit 4: Hardware (4-6 weeks)

Unit Number and Title:	Unit 1 -Digital Citizenship, IT Support, & Professionalism
Duration:	3-5 weeks
Resource(s):	Computers, lab tools and equipment, various consumables.
Unit Overview:	IT support is essential to any school or business, this unit focuses on the interaction between an IT professional and an end user.
Learning Goals	
Standard(s):	Connecticut Technology Education: CADD.04.03 Define and apply computer terminology. AVC.01 Identify, analyze and synthesize historical, social, economic, environmental, and government regulations impact on Communications technology from multiple authoritative sources. AVC.02 Define and utilize communications technology systems domain specific words and phrases. AVC.03 Demonstrate the use of appropriate communication equipment for the delivery of a message. CompTIA A+: (Core 2) 4.1 Compare and contrast best practices associated with types of documentation. 4.2 Given a scenario, implement basic change management best practices. 4.6 Explain the processes for addressing prohibited content/activity, and privacy, licensing, and policy concepts. 4.7 Given a scenario, use proper communication techniques and professionalism
Essential Question(s):	● Why is it important to use professional communication in the IT industry? ● What is the importance of documentation? ● What is the process for making a computer or system wide change? ● How has social media and artificial intelligence (AI) changed the world we live in? ● What ethics need to be considered when using social media or AI?

Enduring Understanding(s):	● IT support is essential for the smooth operation of any school or business ● End users must be able to trust their IT professionals and be willing to provide accurate information about problems and make system changes. ● AI has made it easier to create and share content. ● AI is being used to moderate and monitor social media content.
Learning Goal(s): *Students will be able to use their learning to:* (Content/ Skills)	**Content:** (Students will know…) ● skills necessary for proper and professional communication in the Computer Repair and Service field. ● manage change protocols appropriately.. ● how to be a good Digital citizen ● social media can be a tool for good but can also be mishandled. ● artificial intelligence can be a tool for good but can also be mishandled. **Skills:** (Students will be able to…) ● simulate being an IT professional and assisting someone with a problem. ● establish change management protocols for a simulated computer network. ● identify and use best practices for documentation. ● create a repair ticket. ● create a frequently asked questions resource. ● develop and apply strategies for being a responsible digital citizen. ● demonstrate proper use of social media and artificial intelligence. ● generate content using data from social media or AI, while ensuring that the information is accurate, appropriate, and relevant. ● understand why and how changes are applied to devices. ● demonstrate proper communication. ● follow best practices for solving a problem.

Unit Number and Title:	Unit 2: PC Basics
Duration:	3-4 weeks
Resource(s):	Computers, lab tools and equipment, various consumables.
Unit Overview:	Through the setup of a computer workstation, students will gain an understanding of computers, how they work, and what purposes they serve.
Learning Goals	
Standard(s):	Connecticut Technology Education: CADD.04.03 Define and apply computer terminology CompTIA A+: Core 1 3.1 Explain basic cable types, features, and their purposes. 3.2 Identify common connector types. 3.5 Given a scenario, install and configure motherboards, CPUs, and add-on cards. Core 2 4.4 Explain common safety procedures. 4.5 Explain environmental impacts and appropriate controls.
Essential Question(s):	● What is a computer? ● What does the word binary mean relative to the operation and use of computers? ● What is BIOS/UEFI? ● What does "boot" mean regarding computers and how does one boot a computer? ● What is a command line interface? ● What is an operating system? ● What is a graphical user interface?
Enduring	● Computer systems have to be physically connected with peripherals using various cables and

Understanding(s):	connectors, in order for the system to work. ● Operating systems must be installed onto computers and networks, and then the various required software also loaded on for the system to function as planned.
Learning Goal(s): *Students will be able to use their learning to:* (Content/ Skills)	**Content:** (Students will know…) ● identity of the connectors and what they are used for. ● the basis of computing and binary. ● the use of a command line interface. ● how to define standardization within the computing industry. **Skills:** (Students will be able to…) ● setup computer workstations and physically connect all hardware. ● describe and demonstrate the power-on/boot sequence of a typical computer. ● load and use the BIOS/UEFI to make system changes. ● install an operating system onto a computer. ● access the BIOS/UEFI.

Unit Number and Title:	Unit 3: Software
Duration:	3-4 weeks
Resource(s):	Computers, lab tools and equipment, various consumables.
Unit Overview:	An exploration of computer software, the process of installing an operating system in addition to support software.
Learning Goals	
Standard(s):	Connecticut Technology Education: CADD.02.08 Export and import images/files in a variety of file formats. CADD.04.02 Identify and describe the purpose of operating system components. CADD.04.03 Define and apply computer terminology ENG.02.13 Use a variety of productivity software to explain the results of the design process, including spreadsheets, word processing, data analysis, and presentations. AVC.03 Demonstrate the use of appropriate communication equipment for the delivery of a message. CompTIA A+: (Core 1) 3.8 Given a scenario, select and configure appropriate components for a custom PC configuration to meet customer specifications or needs. 3.9 Given a scenario, install and configure common devices. (Core 2) 1.1 Compare and contrast common operating system types and their purpose. 1.2 Compare and contrast features of Microsoft Windows versions. 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. 1.7 Summarize application installation and configuration concepts.

	1.8 Given a scenario, configure Microsoft Windows networking on a client/desktop. 1.9 Given a scenario, use features and tools of the Mac OS and Linux client/desktop operating systems.
Essential Question(s):	● What is an operating system? ● What is Windows? Linux? Mac? ● What is the difference between a GUI and command line operating system?
Enduring Understanding(s):	● Computers use operating systems and software which must be installed on the computer drive before it will function as planned. ● Computer operating systems and software must be managed and configured. ● Computers need command-line interface commands to operate.
Learning Goal(s): *Students will be able to use their learning to:* (Content/ Skills)	**Content:** (Students will know…) ● computer operating systems. ● the software of a computer system. ● the connectors of a computer system. ● Mobile OS vs Desktop OS. **Skills:** (Students will be able to…) ● use software to complete a task.

Unit Number and Title:	Unit 4: Hardware
Duration:	4-6 weeks
Resource(s):	Computers, Lab tools and equipment, various consumables.
Unit Overview:	Explore computer hardware in detail, identify the specific hardware of a system.
Learning Goals	
Standard(s):	Connecticut Technology Education: CADD.04.01 Identify and describe various types of hardware and software. CADD.04.03 Define and apply computer terminology AVC.03 Demonstrate the use of appropriate communication equipment for the delivery of a message. CompTIA A+: (Core 1) 3.1 Explain basic cable types, features, and their purpose 3.2 Identify common connector types. 3.5 Given a scenario, install and configure motherboards, CPUs, and add-on cards. 3.6 Explain the purposes and uses of various peripheral types. 3.7 Summarize power supply types and features 5.4 Given a scenario, troubleshoot video, projector, and display issues. (Core 2) 1.3 Summarize general OS installation considerations and upgrade methods.
Essential Question(s):	● What is BIOS? ● What is form factor? ● What are the connectors for graphics/displays? ● What is RAID?
Enduring	● Hardware must be integrated correctly in order for a computer to function.

Understanding(s):	● Computers utilize common industry connectors to physically connect peripherals or other components. ● Specific hardware needs to be carefully selected when building a computer.
Learning Goal(s): *Students will be able to use their learning to:* (Content/ Skills)	**Content:** (Students will know…) ● computer system hardware. ● computer system connecting devices, cables, etc. **Skills:** (Students will be able to…) ● connect/disconnect all of the parts of a computer. ● set up a working computer system. ● change display & display cables. ● install expansion cards.